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FINANCE MANAGEMENT OF SCIENTIFIC RESEARCH ORGANIZATIONS DISCUSSED

Moscow FINANSY SSSR in Russian No 10, Oct 82 pp 62-69

/Article by S.M. Aleshin, deputy chief of the Administration for Financing Culture and Health of the USSR Ministry of Finance: "An Analysis of the Financial-Economic Activities of Scientific Research Organizations"/

/Text/ In many areas of research Soviet science occupies an advanced position in the world. However, the work of our scientific-research organizations is also marked by substantial inadequacies in the planning of subjects for scientific investigations, the organization of links between science and production, the utilization of material, labor and financial resources and others. It is essential to devote particular attention to the elimination of these inadequacies; this will substantially increase the utilization effectiveness of state appropriations for science. An important role here must be played by analysis of the financial-economic activities of the scientific-research organizations, and by procedures to monitor their operations. An analysis of the financial-economic activities of each of them has its own particular features inasmuch as scientific research is carried out by higher education institutions and by scientific research institutions of the academies of science and other ministries (and agencies), which draw on the budget, as well as by industrial scientific research institutes, which operate on a self-financing basis.

Supervision of the financial-economic activities of a scientific research institute should begin with work to become acquainted with the plan of subjects for its scientific-research work and to determine the appropriateness of the subjects included in the plan with regard to the basic directions established in the charter for the activities of the institute. The employees of the financial organs are not specialists in the area of science which is the concern of the institute being supervised, and this means that they are not in a position to judge the subject plan in terms of the essence of the research projects set out in it (specialists must be brought in for this), but they can discover subjects which do not correspond to the basic directions of the institute. Further, they analyze the subject plan in terms of the types of studies included in it, the level of their significance, their purpose in relation to set goals and their scientific and technical directions.

Scientific-research projects are divided into three types: fundamental research, basic research and development. The purpose of fundamental investigations is to obtain new knowledge about the objective laws of the development of nature and society; over a certain period of time the results of these studies have only scientific significance and can find practical application after additional scientific-research work is completed. A report is the document which confirms the completion of fundamental research. Basic research resolves practical tasks in general form without regard for specific areas, forms or application deadlines; it also comes to an end with the compilation of a report. The main goal of development is the realization of the results of fundamental and basic research in practice. Development projects end with the preparation of technical documentation. In essential cases development is followed by test studies, as well as studies on the industrial application of the scientific research.

Scientific research work can be divided into the following groups according to the level of significance: I) projects of national-economic significance which are carried out on the basis of decrees by the CPSU Central Committee and the USSR Council of Ministers, the state plan for the economic and social development of the USSR, the coordinated plan approved by the State Committee on Science and Technology and the state plan for standarization; II) projects of significance to a sector, which are carried out in accordance with orders from a particular ministry, or agency or with sector plans for the development of science and technology; III) projects which are important for a group of enterprises, and which are carried out at the direction of administrations of a ministry or industrial associations; IV) all other projects stipulated in the plan at the initiative of the institute.

If necessary this grouping can be modified. For example, scientific research projects can be divided according to their purpose into: development of new technical processes; the creation of new products; the creation and improvement of equipment and instruments, and projects in the area of economics, environmental protection, etc. A division of projects can also be made on the basis of scientific and technical directions: the development of new types of raw materials, the production of half-finished products, the automation and mechanization of production; the economics of industry; the protection of labor and the environment; standardization and metrology, etc.

As applied to the specific sectors of the national economy, these groupings are set out in the regulations concerning the procedure for the development, presentation and confirmation of plans for scientific research work, regulations which have been approved by ministries and agencies and are reflected in the code which is set down in the subject plan for every subject. The analysis of the subject plan for scientific-research projects according to types, level of significance and purpose should be reflected in a summary table of basic indicators for the institute's plan (Table 1).

As one can see from the table, the proportion of fundamental research and projects at the first level of significance is low, nor is the proportion of work assigned by the ministry (Level II) high. By far the largest portion (more than 88 percent) of expenditures arises from projects at the third fourth significance levels. This describes the subject matter of an institute's scientific research in general outline.

Table 1

BASIC INDICATORS OF AN INSTITUTE'S 1982 PLAN OF SCIENTIFIC RESEARCH WORK (thousands of rubles)

Level of Work	Indicators	Quantity and cost according to type of work												Total	As a percentage of the total
		Fundamental special purpose assignment				Basic special purpose assignment				Development special purpose assignment					
		a	b	c	Total	a	b	c	Total	a	b	c	Total		
I	Quantity of Work	—	—	—	—	10	—	—	10	—	3	17	20	30	7,3
	Cost	—	—	—	—	1 000	—	—	1 000	—	1 100	3 000	4 100	5 100	5,1
II	Quantity of Work	5	—	5	10	—	4	5	9	—	—	35	35	54	13,2
	Cost	2 000	—	2 500	4 500	—	1 000	1 500	2 500	—	—	17 000	17 000	24 000	23,9
III	Quantity of Work	—	—	—	—	25	30	200	255	—	5	20	25	280	68,3
	Cost	—	—	—	—	3 000	3 000	30 000	36 000	—	1 000	14 000	15 000	51 000	50,9
IV	Quantity of Work	—	—	—	—	—	—	—	—	10	10	26	46	46	11,2
	Cost	—	—	—	—	—	—	—	—	5 000	5 000	10 150	20 150	20 150	20,1
Total	Quantity of Work	5	—	5	10	35	34	205	274	10	18	98	126	410	100,0
	Cost	2 000	—	2 500	4 500	4 000	4 000	31 500	39 500	5 000	7 100	44 150	56 250	100 250	100,0

[1] In this and the other tables the figures are hypothetical.

It is essential to direct particular attention to the nature of the fundamental and basic research which is financed from the budget. Does this research not consist entirely of sector projects which should be financed through ministry funds? Is there not a large number of small subjects, some of which should not be included under the scientific research category? Is the institute's subject plan not overloaded with projects concerning the preparation of all sorts of reference works, instruction plans and other materials for the ministry' apparatus, i.e., with materials which the ministry's employees should compile? Do the topics duplicate each other; have they been carried over from the previous year's plan with only slightly altered titles? Are they low in effectiveness?

Scientific research institutions which operate from budget, as a rule, do not keep accounts according to topics which are financed from the budget. For this reason their scientific research subject plans do not indicate the volume of expenditures on the basis of "budget" subject matter. However, in the standard estimate of expenditures for these institutions, the estimate recommended by the USSR Ministry of Finance in its methods handbook on the compilation of estimates for expenditures (expenses) for the maintenance of scientific research institutions, there is a table of the distribution of expenses according to the structural subdivisions of the institute and according to subjects, on the basis of which an analysis can be conducted of the institute's subject matter according to the significance level of the projects and other indicators. The data of the subject plan for self-financing scientific research institutes and the distribution of expenses according to the structural subdivisions and topics in budget scientific research institutes makes it possible as well to provide a general description of the projects being carried out in the institute's departments and laboratories, having linked this description with the number of research and other personnel employed in these institutions.(Table 2).

Table 2

Name of Structural Subdivisions	Number of Employees		Number of Scientific-Research Projects			Total Cost of Projects in millions of rubles	Cost of Projects at Level of Significance	
	Total	Research Staff	Total	At Level of Significance				
				I	II		I	II
Laboratory No 1	800	200	60	15	10	15.25	2.4	6.5
Laboratory No 2	300	100	40	10	20	40.00	2.0	5.0
Laboratory No 3	700	300	110	--	4	35.00	--	3.0
Laboratory No 4	600	250	100	3	10	30.00	.4	4.5
Laboratory No 5	600	150	100	2	10	20.00	.3	5.0
Total	3,000	1,000	410	30	54	140.25	5.1	24.0

On the basis of the data from the table, one can compare the expenses for the various structural subdivisions, calculated per employee in each laboratory; and it is possible as well to analyze the number of scientific research projects according to all the subdivisions. This makes it possible to find ways, if necessary, to further intensify the analysis of the plan of the institute s scientific research projects. Fulfilment of the plan for scientific research projects is analyzed by comparing the number of actually completed projects with the number of projects which was approved on the basis of the original plan, while taking into account changes made in it over the course of the year. Further, the changes must be characterized, i.e., the number of projects excluded from the plan or halted must be shown, along with the reasons, the number of additional projects and the number of projects for which the completion date has been postponed within the report year or to subsequent years. The summary description of the corrections to the subject plan and of its actual fufilment is given in Table 3.

Table 3

Name of Structural Subdivisions	Number of Projects According to Approved Plan	Excluding Halted Projects	Including Additional Projects	Number of Projects		Percentage Plan Fulfilment	
				According to Corrected Plan	Actual	For Approved Plan	For Corrected Plan
Laboratory No 1	60	--	--	60	60	100.0	100.0
Laboratory No 2	40	--	--	40	40	100.0	100.0
Laboratory No 3	110	5	2	107	105	95.5	98.1
Laboratory No 4	100	2	1	99	97	97.0	98.0
Laboratory No 5	100	3	2	99	98	98.0	99.0
Total	410	10	5	405	400	97.6	98.8
At Level of Significance I	30	--	--	30	30	100.0	100.0
II	54	--	--	54	54	100.0	100.0

Next it is essential to consider fulfilment of the plan for scientific research projects expressed in terms of cost. This analysis is conducted on the basis of data from the bookkeeping accounts of budget scientific research institutions using Form No 2-2 "Report concerning Observance of Expenditures Estimates for Socio-Cultural and Other Institutions and Measures," Form No 4-N "Report concerning Fulfilment of Estimates for Special Means for Scientific Research Projects Carried Out According to Contracts," "Certificate concerning Expenses for Scientific-Research Projects Carried Out at the Expense of the Customer According to Contracts." For self financing organizations it is conducted on the basis of form No 2-N (annual) "Supplement to

the Balance for the Basic Activities of a Scientific Research and Design Organization" and form No 5-N (annual) "Production Expenses (without Intra-Institute Circulation)."

When analyzing a report concerning realization of estimates for expenditures by a scientific research institute which operates from budget, it should be kept in mind that scientific research institutions which have their work planned by the State Committee on Science and Technology, receive credits according to Article 18, "Other Expenditures," while the accounting for actual expenditures is carried out according to particular items of the budget classification. In the report concerning realization of the estimate the plan assignments according to the particular items are set down in the amounts which were originally approved by the managers of the institution, with consideration for the corrections which arise only from government decisions, as well as for the amounts which have been allotted from the reserve of the State Committee on Science and Technology. The corrections which have been introduced in the course of a year by the manager of an institution on the basis of the rights granted to him are not taken into account in the report as part of the column "Approved According to the Estimate for the Year."

Officials of scientific research institutions which have been assigned in the prescribed manner to the labor payment category of "scientific workers" have been granted the right to determine--within the limits of the total amount which has been approved by a higher organizations for expenses--the size of expenditures according to items of the estimate, in addition to the wage fund, as well as to approve the estimate for expenditures and to make changes in it, including increases in expenditures to acquire equipment and other inventory for scientific research using savings of resources which come under other items of the estimate, including savings in the wage fund. Actual expenditures must be analyzed in accordance with the assignments, in which all changes are taken into account. For this reason the analytical table concerning the realization of the estimate for expenditures should include the column "Approved According to the Estimate for the Year with Consideration for Changes Introduced by an Official of the institution."

Current year expenses for items of expenditures according to the estimate of special means to fulfil scientific research projects on the basis of agreements with customers are analyzed according to the data from Form No 4-N. The analysis of plan fulfilment with regard to incoming revenue for these projects, as well as of their profitability, and incomplete expenses for the beginning and end of the year and outstanding payments to the budget is carried out on the basis of data from the certificate concerning expenses for scientific research work which is carried out at the expense of customers and according to agreements.

In order to analyze correctly the data from this certificate it is essential to know well the procedure for filling it out. Columns 4 and 10 ("Incomplete Expenses for the Beginning of the Year" and "Remaining Expenses for the End of the Report Period (Year)" show the balance of credits according

the calulations of No 082 "Expenses for Scientific Research Work on the Basis of Agreements" for projects which are in a state of incomplete production; they also show the cost of special equipment acquired through the resources of the customers, which which will be returned to the customer or left in the institution after the work is completed, as agreed upon with the customer. At the same time this equipment is included in the balance as property of the customer. Column 5 "Incoming Resources--the Yearly Plan" is filled in on the basis of the income portion of the estimate with consideration for the changes which have been made in it in the course of the year according to the prescribed procedure, while column 6 "Incoming Resources--Actual for the Report Period" is equivalent to credit circulation of account No 400 "Income Based on Special Resources." Column 7 "Expenses of the Current Period (Year)" should be equivalent to the debit circulation of Item No 082 and to column 5 under line 1 of Form No 4-N. Column 8 "Expenses Written Off to Projects Fulfilled and Handed Over"is equal to the credit turnover of Item No 082, while column 9 "Handed Over From Realization from Projects Which Have Been Fulfilled" is equal to the credit turnover of Item Number 400. Further, column 4 + column 7 - column 8 = column 10.

The amount by which income exceeds expenditures (profits) is determined as the difference between the amount shown in column 9 and the amount shown in column 8, of which 75 percent goes into the fund for the development of the organization and 25 percent goes into budget income. During the analysis it is absolutely essential to direct attention to the profitableness of scientific research projects carried out according to economic agreements; this indicator is determined according to the following formula:

$$Pr = \frac{P \cdot 100}{E}$$

where Pr is profitableness
P is profit
E is earnings from the realization of completed projects.

A high degree of profitableness, as a rule, is evidence of an excessively high estimate of the cost of the projects; for this reason it is essential to take measures to determine more accurately the cost of these projects according to the estimate. It is also important to check on whether budget resources are being directed to cover partially expenses for research on subject matter which comes under economic agreements. For this purpose the following table must be compiled according to the data of the balance (Table 4).

The amount by which the assets exceed liabilities (398-265 =133) will be the sum of the resources borrowed from the budget or other sources for expenses resulting from subjects researched on the basis of economic agreements. In practice, scientific research institutions sometimes have a single estimate of expenses for scientific research projects which come from budget resources and resources which come from contracted work. In this case the contracted resources in USSR Gosbank institutions are held in a current account in the amount of the assignments.

Table 4

(thousands of rubles)

Assets		Liabilities	
Designation of Items	Amount	Designation of Items	Amount
No 082--Expenses for scientific research projects according to agreements	198	No 175--Advances for scientific research work for customers	110
No 174--Accounts with customers of scientific research projects subject to payment	70	No 178--accounts with other debtors and creditors	50
No 110--current account of amounts for commissions	--	Earnings from the realization of projects being completed (Column 9 of the certificate, credit of item No 082)	105
No 111--current account for special resources	105		
No 178--accounts with other debtors creditors	25		
Total	398	Total	265

The rules approved by the USSR Ministry of Finance for compiling and implementing the USSR State Budget establish that when there is financing from the budget, consideration must be given to the amounts of above-norm reserves of commercial and material valuables, as well as to the amounts by which debtor indebtedness (not counting advances to communication organs for postal, telegraph and telephone accounts or advances for business trips not completed by 1 Jan) exceeds creditor indebtedness, amounts which are discovered from the previous year's accounts of institutions which operate on the budget. The norms for reserves of commerical-material valuables for institutions which come under union jurisdiction are determined by ministries and agencies in agreement with the USSR Ministry of Financ, and for institutions which come under republic or local jurisdiction they are determined by means of a procedure established in the union republics.

The correct determination of the above-norm reserves of materials for every scientific-research institution is one of the most important tasks of the analysis. The cost of materials which must be taken into account when financing occurs is calculated on the basis of the report from Form No 6 "Yearly Report on the Movement of Material Valuables" according to the following procedure (Table 5).

In this case 11,700 rubles must be taken into account despite the fact that the actual balance remaining at the end of the year for medications and fuel is lower than that established by the norms. The total amount which

Table 5
(rubles)

Types of Materials	Expended for needs of institutions in the year	Balance at the End of the Year	Reserve Norm		Amount which must be taken into account
			As a percentage of of the year's expenses	In absolute terms	
For educational, scientific and other purposes	105,000	7,300	40	4,200	3,100
Foodstuffs	25,000	1,400	5	1,250	150
Medications and dressings	8,000	1,500	25	2,000	--
Supplies and office fixtures	75,000	19,150	20	15,000	4,150
Fuel and Lubrication materials	68,000	15,000	25	17,000	--
Fodder and forage	9,000	4,000	30	2,700	1,300
Other materials	25,000	3,000	10	2,500	500
Materials en route	--	2,500	--	--	2,500
Total	315,000	53,850	--	44,650	11,700

is to be taken into account for the scientific organizations of a ministry or an agency must be equal to the total of the amounts to be taken into account for each institution. The financial organs must not make this accounting according to the combined form No 6, because this would lead to a reduction in the amount to be taken into account. In the same manner the accounting of debtor indebtedness should be made after creditor indebtedness has been subtracted. Fulfilment of the estimate for expenses for scientific research work, the volume of work fulfiled, the sources of its financing, the state of unfinished production and the results of the financial and economic activities of scientific research institutes which operate on a self financing system are analyzed on the basis of the data from Form No 5-N and Form No 2-N. The basic task of an analysis concerning fulfilment of the estimate for the production expenses of scientific research work is to discover whether actual expenditures deviate from the amounts specified according to the estimate for elements of expenses and individual types of expenditures. For this kind of analysis it is essential to compile a table (Table 6).

Table 6

Number of line	Elements of Expenses	Plan	Report	Deviations	
				Absolute Amount (+,-)	Expressed as percentage of plan
1	2	3	4	5	6

The plan indicators must be clarified by taking into account various changes, including those made by the director of a scientific research institute in accordance with the rights granted to him. Under the expense element "Wages--Basic and Supplemental" the following should be distinguished: staff personnel, bonus fund, nonstaff personnel. When comparing actual with planned expenditures, it is essential to pay attention to the need to use a single set of methods to determine expenses for each element in the estimate and the report. In doing this one should be guided by the directions of the USSR Ministry of Finance concerning the Basic Regulations for Accounting and Calculating the Cost of Work in Self-Financing Scientific Research Organizations. Further, overhead expenses are analyzed on the basis of data from the reports of Form No 5-N and Form No 14, for which the following analytical table (Table 7) is compiled.

Table 7

No p/p	Name of Overhead Items	1980 Report	1981		Including outlays for economic elements				
			Plan	Report	Materials and Purchased Half-Finished Products	Fuel and Energy From Outside	Wages	Additions to Wages	Other Expenses
1	2	3	4	5	6	7	8	9	10

Particular attention must be given to the correctness of expenditures to maintain the administrative apparatus, to the reason for the formation of nonproduction expenses and to the prepration of suggestions to eliminate inadequacies. When considering expenses for invention, rationalization and technical improvements, it is essential to direct attention to the results of introducing new inventions and improvements into production and the advisability of spending resources for this purpose. An analysis of expenses for on-the-job work experience and for personnel training, including expenditures for the support of graduate study, should be carried out by extracting the report data from Form No 4-k and Form No 3-8, taking into account the fulfilment of the plan for the acceptance of graduate students, the number who graduate and the number of those who drop out, as well as the proportion of people who defend their dissertaions. All these indicators describe the effectiveness of graduate work.

In addition to the fulfilment analysis for the estimate of scientific research production expenses, it is essential to analyze expenses for the entire volume of scientific research projects which are completed with all sources of financing, i.e., Form No 2-N, in which the volumes of work and unfinished production are shown according to the estimated and actual cost. A general description of the sources of financing for scientific research work can be presented in Table 8.

Table 8

Sources of Financing	Plan		Actual		Percentage fulfilment of plan
	Absolute amounts, in millions of rubles	Percentage of Total	Absolute amounts, millions of rubles	Percentage of total	
Resources derived from UFDST* or other centralized sources	39.5	39.4	38.9	39.7	98.5
Resources from the budget	4.5	4.5	4.45	4.5	98.9
Resources from agreements with customers	56.25	56.1	54.70	55.8	97.2
Including customers within its own ministry (agency)	38.10	--	37.80	--	99.2
The same expressed as a percentage of the total amount of contracted work	67.7	--	69.1	--	--
Total	100.25	100.0	98.05	100.0	97.8

*United Fund for the Development of Science and Technology

From these data plan fulfilment for the individual sources of financing for scientific-research work can be seen, as can changes in the structure of sources. When the report indicators deviate sharply from the plan, it is essential to carry out an in-depth analysis in order to clarify the reasons for the deviations and to develop measures to eliminate them. Then, Form No 2-N should be used to analyze the state of unfinished production at the beginning and end of the year, once this work has been compared with the fulfilment over the course of the year of the volume of work; it should also be compared with the norm for working capital in unfinished production, and the reasons for its absolute growth should be established, as should the reasons for the increase in its proportion in the volume of fulfilled projects.

When analyzing the results of work by the scientific-research, design, planning and design and technological organizations, and when determing the correctness of budget calculations with regard to profit, it should be kept in mind that these organizations (with the exception of organizations which, in accordance with the 12 July 1979 CPSU Central Committee and USSR Council of Ministers decree, are forming economic incentive funds) have the right to direct 75 percent of the amount by which income exceeds expenditures (profit) for scientific research, planning and design and technological projects which are fulfiled according to agreements and intra-ministry orders

for expanding and strengthening the material-technical base, and for acquiring equipment and materials above the allotments stipulated in the approved estimate. The remaining 25 percent of the excess amount (i.e., of the profit) is put by the organizations into the income of the appropriate budget depending on the jurisdiction under which the organizations fall.

Calculating the 75 percent of profit, which remains at the disposal of the organizations and the 25 percent of profit which is directed into budget income, must be done after the following two amounts are excluded from the amount of actual profits obtained from the fulfilment of these projects: above-plan losses from the operation of housing and public utilities and unused resources to maintain the administrative apparatus, resources which are subject to transfer into the income of the union budget. If the actual profit according to the balance is lower or higher than the amount by which income exceeds expenditures (profit) for the work which has been handed over, or according to the balance of the organization there is a loss, then the calculation of the 75 percent of profit, which is to remain at the disposal of the organization, and of the 25 percent of the profit which is subject to inclusion in the budget income, is carried out in the following manner.

Balance indicators	Calculation procedure
The actual profit according to the organization's balance is lower than the amount by which income exceeds expenses (profit) for the completed work, taking into account the exclusion of above-plan losses from the operation of housing and public utilities and under-used resources to maintain the administrative apparatus, which are subject to transfer into budget income.	The calulation of the 75 percent and the 25 percent of profit is made from the actual balance profit, excluding the above-plan losses from housing and public utilities and unused resources for the maintenance of the administrative apparatus, which are subject to transfer into budget income.
Actual profit according to the balance is higher than the amount by which income exceeds expenditures (profit) from completed work carried out according to agreements and intra-ministry orders.	The calculation of the 75 percent and 25 percent of profit, which remains at the disposal of the organization and which is shifted into budget income, is made from the amount by which income exceeds expenditures (profit) from work completed according to agreements and intra-ministry orders, excluding from it above plan losses from housing and public utilities and unused resources for the maintenance of the administrative apparatus, resources which are subject to transfer into budget income. The

	difference between the balance profit and the amount by which income exceeds expenditures (profit) for completed work according to agreements and intra-ministry orders is put in its entirety into the budget.
According to the organization's balance there appears a loss, and for work completed according to agreements and intra-ministry orders there is an excess of income over expenditures (profit)	25 percent of the amount by which income exceeds expenditures (profit) is not transferred into budget income and 75 percent of this excess is not assigned to the organization for its use.

At the same time it should be kept in mind that a number of union republics and the USSR Academy of Sciences have made decisions to limit to 15 percent the profitability of economically contracted scientific research work and to include in the budget income the entire amount of profit obtained above this rate. In addition, part of the 75 percent of the profit, which remains at the disposal of VUZ's and the corresponding scientific organizations, could be directed as a source of financing for planned capital investments.

At the present time the number of personnel is being reduced by no less than five percent in comparison with the actual number of employees in 1980; this reduction is based on individual assignments obtained by scientific institutions and organizations from ministries and agencies. In analyzing the accounts concerning fulfilment of the labor plan, it is essential to direct particular attention to the timeliness and correctness of the measures carried out during the fiscal year to reduce the number of personnel and to put into the income of the union budget in 1982 amounts established for savings to be derived from lower costs for wages and social insurance benefits resulting from the reduction in the number of personnel.

The results of the analysis of a scientific organization's financial and economic activities are stated briefly in the conclusion of the report, with a mandatory indication of the financial results (the amounts which must be accounted for in financing and transferring resources into budget income, excess or inadequate amounts of working capital, etc.). Suggestions are also put forward as to how the operations of the organization can be improved. The question of the procedure for considering the conclusions arising from the report is resolved by the appropriate higher organization.

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INDUSTRIAL APPLICATIONS OF SCIENCE KEY TO SOVIET NATIONAL ECONOMY

Moscow TRUD in Russian 16 Sep 82 p 1

[Article by Academician G. Marchuk, deputy chairman of USSR Council of Ministers and chairman of USSR Committee on Science and Technology: "Science--Forever Searching"]

[Text] Right now, as we celebrate the sixtieth birthday of the USSR, we are evaluating the road that has been traveled. We can say with certainty that the Soviet people are energetically implementing plans for the near future, plans for economic and social development of the USSR for the period up to 1990.

These plans are the concrete embodiment of the program developed by the Twenty-Sixth CPSU Congress. The main peculiarity of the program is completion of the move of the national economy to an intense path of development. This course has been completely reflected in the assignments for the Eleventh Five-Year Plan. How important it is for the nation has been very well stated in speeches by Leonid Il'ich Brezhnev at the November 1981 and May 1982 plenary sessions of the CPSU Central Committee.

In past years, major emphasis in our nation has been placed on raising the productive and economic potential. Capital investments have been mainly in construction of new enterprises, in expanding the material base. As a result, over the last two five-year plans the national economy has achieved considerable success: fixed production capital has been practically doubled. It now remains to get the resultant return from this capital. How is this to be done? Naturally by increasing labor productivity: perfecting equipment, conserving raw materials, energy and human labor.

The scales of development of our economy are now such that the latest advances in science and technology are not always introduced in time to meet the needs of the day. It is no accident that a new approach has been needed to management of the science—engineering—production cycle. There was a time not so long ago when developments of an intersectoral nature were rather frequently delayed by bureaucratic barriers. The sectors of the national economy were mainly dealing with their own current problems and carrying out their own scientific and technical programs. The moreso as broad intersectoral problems, though considered necessary for solution, were almost unsupported by material resources.

To keep the science—engineering—production cycle from breaking down, the Twenty-Sixth Congress of the Party formulated the task of organizational and economic unification of the activity of scientific research, design and planning institutions and industrial enterprises. In carrying out this task, the State Committee of the USSR on Science and Technology together with the Academy of Sciences, Gosplan, the Ministry of Higher Education and Gosstroy SSSR have formulated 170 State programs of scientific-technical progress. They propose solution of such intersectoral problems as for example the protection of metals from corrosion, development of new wear-resistant materials, fundamentally new methods of melting and welding and so on. By solving these problems, we will give inestimable support to the fuel-energy complex and machine building, chemistry and production of technically complex consumer goods. I should like to mention in particular that twenty programs are intended for improving the technical level of agriculture.

In a word, the role of scientific-technical progress in further development of our nation is rising sharply. Successful solution of the problems of its acceleration depends in large measure on the state of the material technical base and the level of organization of scientific research. We know how a weak experimental base has an adverse effect on the effectiveness of some scientific research institutes. It is no secret that inadequacies in the leadership of science collectives on the part of ministries and agencies are also very damaging to the cause of inculcation. As a consequence of factors of this kind, we have unjustified delays in the introduction of valuable innovations, sometimes for years. This has been especially detrimental to the development of technologies: their role in many sectors has been minimized. And what is a technology? It is implemented technical science. It still carries a fundamental imprint, but has already become applied and is part of today's engineering.

In our view, when the national economy has been changed over to an intense path of development, there will be an immeasurable enhancement of the significance of technologies: reconstruction, retooling of enterprises, as a rule are based on modern engineering.

Therefore the USSR State Committee on Science and Technology in conjunction with ministries and agencies is now turning attention to organizing a network of technological centers. It is intended to set them up in all sectors. While it is true that they already exist in some places, we have in mind such large centers as would influence the development and introduction of modern technologies.

As an example I will take up the experience of the Ministry of the Electrical Engineering Industry. In this sector a structure of institutes and organizations has been set up that subsumes three levels with respect to all major areas of development.

The first level is formed by four scientific-technical centers doing work of sector-wide significance (theoretical and research studies, scientific and experimental-design developments).

The second level comprises scientific-technical centers where scientific, design and technological developments are in progress in the subsectors attached to them. These centers bear the full responsibility to the ministries for the technical level of goods produced, for perfection of technology and improvement of the technical-economic indices of the work of enterprises.

The third level is specialized institutes and technological design organizations that are mainly subordinate to production associations and enterprises.

Such a structure, as well as the system of certification of technological processes that is in wide use here have shortened the period of development of new items by a factor of 1.5-2; nearly half the goods of the entire sector are produced in the higher category of quality.

All the same, the foundation of foundations in this work is, of course, people. The personal contribution of each worker in science, of each collaborator in planning and design organizations, technologists and engineers. Today as never before we need the creative activity and initiative of all those employed in the area of science and scientific research. And the role of socialist competition has been underestimated in this connection.

This principle is becoming ever more widespread in science from year to year. The time is past for doubting the effectiveness of socialist competition especially in science collectives. Today it has acquired the most diverse forms here: collective and personal obligations, inspections, contests, joint obligations of laboratories or even of several institutes working on a single problem with production collectives and sectoral scientific research institutes.

Now the main criterion for evaluating the work of science collectives is primarily participation in developing and putting into production machines, equipment and progressive technologies based on implementation of fundamental and applied research.

Transformation of a scientific discovery to the sphere of material production is a major link in the science—production system. And here a pre-eminent role is played by the USSR Academy of Sciences and the academies of sciences of the Soviet republics.

For example over the last five years in the Academy of Sciences of the Ukrainian SSR more than 300 technologies of various levels have been developed. Some of them have led to appreciable, truly revolutionary transformations in industry --in metallurgy and machine building. A number of first-rank developments have been realized in the national economy by the Institute of Atomic Energy imeni I. V. Kurchatov--mainly high-power reactors for nuclear electric plants. Who does not know the weighty contribution to maritime shipments that has been made by a whole family of atomic ice cutters?

The work by Leningrad scientists might serve as an example of the intensity of scientific research and introduction of its results. They have developed the first cryogenic turbogenerator in the world, using phenomena of superconductivity. The efficiency of such a generator reaches 99.5%, a value unheard of in the world until now.

Belorussian scientists have made great strides in resolving engineering problems by setting up scientific production associations enabling appreciable acceleration of the process of introducing scientific results into practice. We have in mind primarily the scientific production association of powder metallurgy; thanks to this association, enterprises even now are producing about a hundred metric tons of goods per year. The association is making powder materials and composites for twelve ministries.

It is precisely for the purpose of appreciably accelerating the process of introducing scientific results into industry that applied science is actively developing in the Siberian Department of the USSR Academy of Sciences near the "Academy towns." Sectoral scientific research institutes and design offices here are effectively relating fundamental science to production. As a result, the economic effect from introduction has been 250 million rubles in the Tenth Five-Year Plan alone.

Of course, socialist competition in the scientific-technical sphere has some peculiarities associated with the specifics of work by researchers, designers and planners. It is no simple matter to evaluate a scientist's work, particularly that in fundamental research. Any major scientific study is a prolonged process involving interpretation of results and comprehensive discussion. It is only several years after publication, granting of copyrights or patents, after recognition of results by the scientific community that an idea can be had of the contribution made by any research, of its place among Soviet and worldwide achievements.

Nonetheless, we do have experience in organizing socialist competition in scientific institutions involved with fundamental research. I cannot fail to mention the serious creative activity of Party and trade union organizations of the Institute of Chemical Physics of the USSR Academy of Sciences. Here the necessary procedural materials have been worked out, and criteria have been defined for evaluating the results of scientists.

However, much remains to be done in this area, especially for the trade unions. For while forms and methods of creative cooperation within a laboratory or department, within the framework of a single institute are more or less clear, they are only in the planning stage between related laboratories of different institutes and between institutes of the same sector. Of course it is difficult to compare the labor of science collectives when one is involved with fundamental developments while another is solving applied problems. But practice shows that even in this case criteria can be found: after all, our main goal is to increase the effectiveness of work of scientific institutions.

Realization of the goals of scientific and technical progress depends to a decisive degree today on the responsibility of persons for the work with which they are entrusted. While comparatively little depended on the worker of yesterday, today's operator in chemical facilities, the electrician on duty or the mechanic in continuous production departments is reponsible for trouble-free operation of many units and dozens of coworkers. And if a person lets his attention wander on any section, compensation for losses may be required many times over.

And yet another typical sign of the times: people are becoming more and more involved in management of powerful, complex and costly equipment. According to estimates of economists, the average worker in the agricultural sector in 1990-2000 will have at his disposal production equipment valued at 25,000-30,000 rubles. Under these conditions, factors of production efficiency that are directly dependent on the level of skill, organization and self-discipline, interest in work results, capability and desire to work, will become decisive. It is for this reason that a balance is so important between creative capabilities, responsibility of present-day workers and the capabilities made available to them by production. Only in the case where these are in harmonious agreement can scientific progress give the maximum effect.

The coming decade should mark a new stage in connecting the advantages of the scientific-technical revolution to the advantages of socialism. In prospect is considerably more complete and effective use of the enormous productive and scientific-technical potential brought about by the self-sacrificing labor of the Soviet people. The goal has been formulated of ensuring further progress of the mature socialist society. As stated in the summary report of the Twenty-Sixth Party Congress: "Today, looking forward five or ten years, we cannot forget that it is in these years that we will lay the foundations and create the national economic structure with which our nation will enter the twenty-first century."

A major component of this national economic structure is accelerated development of science and technical progress.

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PRODUCTION USE OF RESEARCH RESULTS LAGGING IN USSR

Minsk PROMYSHLENNOST' BELORUSSII in Russian No 10, Oct 82 pp 48-50

[Article by I. Filonov, chief of the department of the theory of mechanisms and machines, Belorussian Polytechnical Institute, chairman of BRS NPO Committee on Problems of Introducing New Technology and Research Results: "How to Overcome Resistance"]

> [Text] Experience shows that the weakest links in the science—production chain are those associated with practical realization of the achievements of scientists. For example, each year only 25-30 percent of registered inventions are introduced. There is an increase in the number of unintroduced works from year to year. In this connection, we should like to mention the words of Academician M. V. Keldysh to the effect that the leading nation may be not the one that has made a discovery, but the one that has best organized its use.

Realization of scientific research can be accelerated by unifying individual stages: fundamental research—major developments—industrial production. Despite the undoubted advances in this area, development and assimilation of new models of machine-building goods produced in large and mass series (motor vehicles, tractors, combines, machine tools, electric motors) are exceeding the optimum time periods as formerly. And many innovations are still on the drawing board. For example, there are more than fifty patents for a variety of engineering advances at Belorussian Polytechnical Institute in the departments of the theory of mechanisms and machines, and metal-cutting machines and tools alone. Unfortunately, most of the engineering advances within the walls of the institute cannot even be tested.

Introduction... It seems that the word itself assumes resistance to penetration of anything new into some region. In any event, we have already become nearly accustomed to this connotation of the term. Instead of getting a green light, progressive technology meets obstacles on its path. Let's try to figure out what's going on here.

The individual stages of the process of introduction have already been organized and set down in an All-Union State Standard. The sequential stages of

development of new technology have been established (experimental model, trial and pilot [control] series, mass production); type stages have been worked out on creation of new technology.

The type process for machine building, that unifies the stages of research and consumption, consists of 11 stages (beginning with scientific research work and ending with manufacture of the pilot industrial model under series production conditions). The cycle that has been worked out corresponds to principles of planning with respect to final results and reflects the pattern of interaction of science and production.

The stages of the research—consumption process are not uniform with respect to expenditures and results. Expenditures are distributed in percent as follows: research--2; development--5; experimental production--15; series production--33; utilization--45. The "research" and "development" stages are characterized by outlays alone; mastery of the first models is distinguished mainly by information value. This is why the success of scientific research, design and technological developments is determined only by the result of using them in production. Usually the first economic effect is realized on the "mastery" stage. But this effect is less than the preceding expenditures. And new engineering advances give a perceptible effect only on the stage of "propagation". This same stage is typified by maximum outlays, not to mention psychological barriers. All this makes interested organizations less than enthusiastic about innovations. As a result, there is an unjustifiably slow increase in the technical level, quality and patentability of equipment and devices, especially metal-working machine tools, peripheral equipment for computer facilities and the like.

As yet there are no objective criteria for evaluating the activity of enterprises that stimulate mastery of new technology, analysis and dissemination of leading work experience. Some sectors of industry are only just beginning to be conscious of the influence of technical policy that is being implemented today on the technical level of yesterday.

Technology has the concept of "automatic control". This is maintenance of the optimum internal parameters of a system by regulating input signals that arise in turn as a result of deviation of output data from required quality criteria. Let us say that an airplane being flown by an autopilot deviates from the course under the action of side winds. Instruments register the deviation and send a signal to a logic unit that gives a command to the autopilot. But the main sense of automatic control is that monitoring and correction go on continuously. That is why the airplane does not fly in a zigzag pattern, but keeps on the true course even in a gale. Systems of this kind are in operation in electronics, chemical technology and machine building. But after all, even the creative process of engineering activity has the goal of products of a certain quality at the output.

Why is it that the production of obsolescent equipment sometimes goes on for years? Everyone sees the alarm signal, but the command to change course does not get there in time. And the call to battle stations doesn't start until the emergency light is on (reduced exports, massive complaints).

The best organization of control of the process of engineering activity should be taken as automatic, i. e. self-adjusting, with criteria for evaluation of results that vary according to necessity. Of course it is more complicated to set up such a system than to make an autopilot, but it is needed for producing technology in line with present-day requirements.

Over the last 20 years, the time for output of items has been reduced five-fold, while periods of technological preparation have increased by a factor of 1.5-2. In some sectors these time periods have even become comparable to the periods of manufacture. Here 1-2 years are spent on preparation of documentation, tools and fittings, and up to 60 percent of the labor inputs planned for mastery of the new items are expended.

Fulfillment of plan quotas on new technology is delayed in large measure by the weakness of the experimental base and production capabilities with respect to output of technological fittings. Development of new designs necessitates experimental stands, small-series laboratory and shop tests. A lack in this area increases the time of mastery and delays any perceptible effect.

The capabilities of plant laboratories and scientific subdivisions of enterprises are being inefficiently utilized. Often they are not staffed with skilled science personnel, are overloaded with minor jobs, and even involved in series production.

Some sectors have an irrational structure of distribution of scientific forces: most of the skilled personnel remain outside of the sphere of material production, taking practically no part in development of applied science in design organizations, with weak ties to enterprises realizing advances of modern science. It has already been proved that a leading role in planning new kinds of technological equipment should go to the client rather than to scientific design organizations and developers. It is only the users of equipment that can best formulate the technical specifications for new kinds of machines, equipment and devices.

But it is not just the introductory difficulties, organizational problems and psychological barriers that stand in the way of new technology. In the course of scientific planning work, problems are frequently solved that have no direct relation to the project. Practice shows that the set of best models of technology is created just on that stage of individual creative thought. There are many such "unplanned" developments in institutions of higher learning. However, despite all their originality, novelty and value for practice, most of them remain known only to a narrow circle of persons.

Workers of industry that are interested in introduction have not the slightest inkling of these developments. As of now, no goal-directed analysis is being made of such developments, there is no evaluation of their readiness for use, no plan of design and technological developments necessary for putting them into production. This is an enormous reserve.

For example, Belorussian Polytechnical Institute has accumulated considerable experience in creating new machine tools and cutting tools for finishing the

working surfaces of machine parts, developed and mastered new working processes of machine building and methods of automatic control. Unfortunately, a great deal of this development is not being put to use.

Also remaining to the side of production for now is the considerable experience of the above-mentioned departments in perfecting technology of manufacturing structural components and parts of machine tools for the bearing industry. And the conditions of mass production of such items as bearing rollers for the GPZ-11 have remained on the former level for about 20 years now.

The scientific-technical level of invention work in institutions of higher learning, the significance of the problems to be solved even now necessitate goal-direct analysis and precise planning for the soonest possible introduction of new things into production. But for this purpose a coordination center (introduction department) is needed. So far, the only such subdivision is in the Academy of Sciences of the republic. Vuz developments lie in archives as before. And it is not just that this reduces the effectiveness of scientific research in vuzes--applied engineering advances suffer from "academic" bias, inadaptability to the requirements of real production.

It would be logical to set up a material-technical base for the department of introduction supported by the largest UNPO's [expansion not given]. Then the vuz would have the capability of making and assembling the most important subassemblies by in-house forces with the technical supervision and participation of the inventors themselves. There is no doubt that the economic effectiveness of goal-directed and specially planned introduction of new technology would be very quickly felt. The public sector of science only partly fills the vacuum in this area, acting as a coordination council in implementing relations between science and production. This subdivision is new: the BRS NTO Presidium had established a Committee on Problems of Introducing New Technology and Research Results three years ago. This committee included workers of vuzes, scientific research institutes of the BSSR Academy of Sciences, design offices, and plants in Minsk and other cities of the republic. The committee analyzes completed studies, organizes public control of the progress of republic scientific and technical programs, studies prospects for introducing new technology in leading enterprises of the republic.

The information agency of the scientific-technical society is successfully fulfilling its functions, but in handling questions of specific introduction of innovations, the community has the right of only a "consultative" vote. But there are certainly enough examples where even well known production developments with unarguable effectiveness are introduced for years. The process cannot be accelerated even by more influential forces than scientific-technical agencies--ministries and Gosplan.

New technology is not any longer science, but neither is it production. It is time to ask whether it is not reasonable to entrust this matter to a third party such as a specialized introductory organization existing on principles of cost accounting rather than on a society basis. It would relieve science of unaccustomed production concerns, and production of burdensome technological experiments and experimental checks. Both interested parties would pay for the services of such an organization...

How is resistance to be overcome? So far, there is no ready answer to the question. But the ever increasing volume of developments remaining on the sidelines of scientific and technical progress prove that introduction is growing into a national economic problem that needs as much attention as science and production individually. The answer should be sought conjointly.

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SCIENTIFIC AND TECHNICAL PROPAGANDA DISCUSSED

Minsk KOMMUNIST BELORUSSII in Russian No 11, Nov 82 pp 75-80

[Article by Ye. Bel'skiy, honored scientist and technologist of the BeSSR, doctor of technical sciences, professor and department head of the Belorussian Polytechnical Institute; and D. Kukuy, candidate of technical sciences and assistant professor, in the column "Integration of Science and Production": "Increasing the Effectiveness of Scientific and Technical Propaganda"]

[Text] In the age of the scientific and technical revolution, true progress in any sphere of production is possible only with a practical application of advanced scientific achievements. Reducing the length of the cycle of "laboratory development--industrial approval--incorporation into production" is today's most pressing problem, and representatives of science and production are working on its resolution. Its resolution opens up great prospects for further development of the national economy. Furthermore, as is emphasized in the decisions of the 26th CPSU Congress, only on this basis is it possible to implement low-waste and waste-free technologies, to draw a maximum amount of local forms of raw materials and other materials into circulation, to utilize secondary products, to develop and make rational use of energy, material and labor-saving processes.

It is very important to bring the results of scientific developments of research collectives to the attention of production workers as quickly as possible. The more practical, intelligible and generally accessible the information is made, the greater the results will be. This is the reason propaganda for scientific and technical information is needed.

Lectures, prepared, organized and presented as outlined by the "Znaniye" society, form an important link between researchers and production workers. This of course does not exclude other forms of propaganda activity. But it seems that the possibilities of lecturing work by scholars are still underestimated. The fact that there are great possibilities here is born out by the experience of the society's primary organization established in the Belorussian Polytechnical Institute.

Any creative scientific and technical collective has among its assets a number of long-range developments. In order for them to be presented to production

workers in as short a time as possible and as effectively as possible, we see a primary role being played by the subdivisions of the "Znaniye" society.

Here, as an example, is how the primary organization of the "Material Science and Casting Production" department of the Belorussian Polytechnical Institute conducts this work. This collective is involved in finding new, more efficient materials for casting molds, developing contemporary technological processes for making molds, including use of plasma pulverization. They also conduct research on the possibilities of obtaining a cast instrument fitting and study methods of increasing its stability with the aid of diffusion strengthening of the working surface layer. Primary attention is devoted to development and creation of combined technological processes which provide a sharp decrease in energy consumption. Every year research operations costing 300,000 rubles are conducted; implementation of their results provided economic gains of over 2.2 million rubles in 1981. So, for each ruble spent, there is a return of over 7 rubles. This research is primarily on the level of inventions, and some of the inventions are patented abroad.

The department staff members are not satisfied with achievements in scientific work alone. They actively seek out methods for disseminating and incorporating their innovations at industrial enterprises, and with this as a goal, they make regular visits to plants inside and outside our republic. This also fulfills the assignments of the primary organization of the "Znaniye" society. As a result of this diversified activity, ties are strengthened and relations of constant cooperation are established.

A staff member making a visit to an enterprise knows ahead of time about the technical demands of the plant's various subdivisions and receives an assignment from the department to give a lecture or conduct a discussion on a specific topic. In the process of carrying out this assignment, an interested discussion often develops, which makes it possible to reveal in more detail results of completed research on the one hand, and production problems on the other hand. Many students are also drawn into this activity. Their discussions, prepared according to a program of social and political practice, include information on the institute, faculty, specialization, and in some cases, on the elements of research carried out with student participation.

Some people might object to this, questioning whether such extensive propaganda work, that even includes students, is really needed. We are convinced that it is not only needed, it is essential. After all, the notion still exists of casting production consisting primarily of melting equipment, and of course, furnaces and molding materials, which are still called "molding loam"; this is the unavoidable dust, gases and screening materials. However, contemporary casting technology assumes first of all, as much mechanization of industrial processes as possible, and often complete automation, use of robots, industrial manipulators, automated monitors, machinery to carry out as many tasks as possible, and so on. Operation of all this equipment would be unthinkable without an electronic computer and software. Colossal changes and industrial processes have taken place in mold making. For example, a labor-intensive element, such as "loam", with its necessary mechanical preparation, tamper, and so on, in many cases is being replaced by liquid deformable mixtures which are "poured"

into a model and harden by themselves, and turn into a reliable mold for molten metal. Creation of mixtures like this is possible only on a foundation of the basic sciences, such as physics and chemistry.

Among the new industrial processes being developed at the department, the special methods for obtaining castings should be mentioned: casting into permanent molds, continuous casting, vacuum and magnetic molding. The "loam" itself (sand and clay mixtures) has become an object of great attention, since it involves great expenditures on transport, searching for new sand and clay deposits, and so on. At the same time, research in this area shows that with the help of electro-hydraulic effects, laser processing, or ultrasound, a significant proportion of the loam can be restored on the spot. And even the traditional furnace has changed substantially in recent years. Incidentally, our republic's scientists and production workers at the Minsk Heating Equipment Plant, under the direction of the plant's chief engineer, I. Potapnev, made a large contribution to the work done on improving the design of the furnaces. Results of this joint work are being incorporated by many enterprises, and in particular by the Minsk tractor and motor vehicle plants.

Like many other subdivisions of the "Znaniye" society, every year the primary organization at the BPI [Belorussian Polytechnical Institute] updates and publishes the topics of the most important lectures and lecture cycles given by the society's members. An effort is made as this is done to take into account the corresponding demand. And although the demand is not as great as it should be, inquiries are made which then form the basis for close contacts and joint efforts to find solutions to various problems.

We will cite an example. The Orsha Tool Making Plant asked for someone to give a lecture on the topic of "Increasing Efficiency of Utilization of Tool Making Materials". M. Sitkevich, assistant professor and candidate of technical sciences, was sent. The lecture was received with interest and a series of consultations followed the lecture. The result of these was the signing of an agreement on creative collaboration, which later grew into an economic agreement. This is how a beginning was made toward solving a problem affecting both sides, involving more efficient utilization of expensive material that is in short supply, and is needed in large quantities in machine building and other metal working sectors--highly alloyed fast-cutting steel. Work was completed at the end of 1981 on incorporation of a casting tool with a very impressive economic effect, exceeding production expenses by a large factor. At present the BPI maintains close ties with this plant and of course the problem that was solved is not the last in our creative cooperation.

Certain measures have become traditional for the activity of the "Znaniye" society's primary organization at the BPI, for example, "Days of the Scientist", "Meetings with Science", and "Roundtable Discussions". These activities are conducted regularly at many plants, especially the Minsk tractor and motor vehicle plants. During such meetings, pressing technical problems involved in production are spelled out in more detail and ways to solve them are discussed. For example, during a discussion conducted by A. Klyshko, a teacher, at the Minsk Motor Vehicle Plant, several ideas originating from work of the institute's scientists were expressed. These ideas interested the plant's workers, and

work is already being done on industrial application of mold mixtures from products that used to be just waste. The successful transformation of "wastes into income" is possible thanks to the kind of cooperation found at the Minsk Heating Equipment Plant, Soligorsk Casting Enterprise, and a number of other enterprises.

We should mention that an analysis of the activities of the institute's various subdivisions in the field of scientific and technical propaganda shows that it is not always as effective as it should be. In our view, this is tied to the fact that in the lecture hall there often are people with a very wide range of interests and problems; and the need for and advisability of general discussions on the usefulness and utilization of science and its achievements in production have long since past. Today scientific and technical propaganda has real results only when it has a concrete direction and its own, maximally interested audience.

Drawing on these considerations, the BPI department of "Material Science and Casting Production" mentioned above, with the support of the republic and city boards of the "Znaniye" society, conducts scientific-production seminars, whose task consists of popularizing and disseminating among production workers results of scientific research work. Taking part in these seminars are on the one hand, leading researchers, and on the other hand, engineering and technical personnel from enterprises, industrial institutes and institutions inside the republic, and in some cases, even outside the republic. The composition of the seminar participants is determined on the basis of preliminary arrangements.

The topic to be discussed, as a rule, clearly focuses on a specific problem. This makes it possible to conduct the seminar with great interest and effectiveness. So, when the topic of discussion was "New Developments in the Material Science of Casting Molds", all the reports and information tied to the search for highly efficient materials, testing of new industrial processes and incorporating them into production elicited active discussion of the results at a number of plants. In her letter on this subject, L. Yepifanova, director of the molding materials laboratory at one of the machine building plants, noted that "Conducting these activities provides not only broad propaganda of the institute's developments, but also establishes firm ties between science and production, which certainly benefits the national economy."

In 1981 alone, three scientific-production seminars were held, devoted to questions of increasing efficiency of utilization of tool materials, in which specialists representing at least 100 enterprises participated. The practical significance of the discussion was reinforced substantially by the demonstration of new industrial processes.

Seminar participants were given themes for propaganda activities at their own enterprises that were closely tied to the questions discussed at the seminar. It is gratifying that after these meetings and discussions, we had many like-minded people at plants. Here are some excerpts from letters that we received; I. Lazunkov, chief engineer of the Kaliningrad "Stroydormash" [Construction and Road Machinery] plant, wrote: "At the plant, in the engineering and technical collectives and among the workers of the forge and tool shops, there was dis-

cussion of issues raised at the seminar. It was decided to continue the work conducted at the plant on incorporating diffusion strengthening of dies for die forging using industrial coatings." And here is what the chief engineer of the "Riga Electric Machine Building Plant" wrote: "The materials of the seminar are being discussed broadly and in detail at the plant. Presently work is being done to incorporate into production boring of large-size fittings."

Today it can already be stated that the scientific developments discussed at seminars are being incorporated at 13 plants, at least. New economic agreements have been signed, as well as agreements on transferring technical documentation. As a result, in 1981 alone an economic gain of over 800,000 rubles was obtained.

Having accumulated specific experience in conducting seminars on the topic of "Bringing the Department to Production" and being convinced of its effectiveness, those in the BPI primary organization of the "Znaniye" society reached the conclusion that they should test another method of propaganda for scientific research work and demonstrate its practical application in production. This involved the people's university for improving specialists' skills in a specific area of technology. The site for organizing this work should be an enterprise that is large enough and has the appropriate contingent of students, as well as other possibilities--primarily the demand for increasing its scientific and technical potential and the skills of its engineering and technical personnel.

The metallurgical production of the Minsk Motor Vehicle Plant responded with understanding to a similar proposal; there in 1981, with the approval and constant support of the Zavodskoy raykom, the party committee of the plant and the board of the Minsk city "Znaniye" society, a people's university was organized for improving the skills of engineering and technical personnel involved in the problem of "New Materials and Industrial Processes in Casting Production".

The program of courses at the university was formulated with the needs of the plant taken into account. Therefore the lectures which were held during the academic year on a weekly basis, elicited considerable interest among the students and public debates often arose. This interest was also maintained because in addition to teachers from VUZes, leading experts from several other enterprises gave lectures. The final stage of work included preparation of term papers. The topics of the papers were suggested directly by the plant's casting shops, which depend on incorporation or production testing of new technical ideas or industrial processes.

Formulating questions in this way increases the responsibility of the student and his advisor from the institute. As a rule, the defense of a student's paper turns into a scientific-production seminar at which the basic positions of the work are discussed. For example, the work of D. Murav'yev, director of the technical department of metallurgical production, and F. Lirtsman, his assistant, elicited a great deal of interest. The authors analyzed in depth the existing methods for obtaining large steel molds and suggested optimal technological solutions; their fundamental suggestions have already been incorporated into production.

The work of engineering technologists V. Shumskiy and A. Kudaka, "New Heat-Resistant Materials", is of great value to the plant. The results of the work were tested successfully in production and have been accepted for incorporation into production. This provides an annual saving of over 300 tons of furnace oil and some types of production wastes can be utilized that up until now have been dumped.

We could give more examples of successfully completed term papers. We should note that practically all 14 of the topics were fulfilled on a good theoretical scientific and practical level. The most gratifying fact here is that already at the plant testing is being conducted on several industrial solutions that are the result of papers completed by the university's students. Another very important result is that a group of specialists is formed at the plant who are active in incorporating into production developments that offer greater efficiency.

It seems that creative ties of the "VUZ-plant" type and the "department-production" type must be developed and strengthened as much as possible. A necessary condition for this is mutual interest, when not only the institute's workers can be seen at the plant, but when production workers, including the management staff, can be seen in the institute's laboratories. Mutual relations of this type have been established between the department of "Material Science and Casting Production" and the Minsk Heating Equipment Plant and the Kaunas "Tsentrolit" [Central Casting Plant]. It is not surprising that these plants signed long-term agreements on creative collaboration. The primary attention at these plants is focused on scientific and technical cooperation. The plant provides opportunities for testing results obtained in laboratories and the department expands its production possibilities. Naturally, the program also includes questions involving improved training of specialists, which includes not only organization of on-the-job training, but also practical and laboratory work conducted right at the shop. The contacts that are established make it possible to draw more experienced engineering and technical personnel into teaching.

The search for new forms of disseminating scientific and technical information is a large and reliable reserve for increasing the effectiveness of utilizing scientific and technical developments in the national economy. At the contemporary stage, primary organizations of the "Znaniye" society cannot be limited by a strictly educational mission in implementing scientific and technical propaganda. It is necessary to make propaganda as concrete as possible and to create conditions which ensure direct dialogue between the production worker and the researcher, which depends on effective reduction in the time between scientific development and incorporation into production. The "Znaniye" society can and should ensure this connection.

In order for this task of scientific and technical propaganda to be realized more completely, it seems that Minsk and the republic as a whole are seriously in need of a permanent organization center, like the one in Moscow at the Polytechnical Museum, for example. There are also centers of this type, not only in Leningrad and Kiev, but also in a number of the country's oblast centers.

A museum is needed also for active dissemination of scientific and technical ideas and for vocational orientation work; it would also serve as a scientific methodological center, ensuring a high level of teaching in many technical disciplines at all levels, from the VUZ to the vocational-technical school.

9967
CSO: 1814/41

IMPROVEMENTS NEEDED IN CONTRACTUAL ARRANGEMENTS BETWEEN SCIENCE, INDUSTRY

Moscow EKONOMICHESKAYA GAZETA in Russian No 40, Oct 82 p 8

[Article by B. Puginskiy, RSFSR deputy chief State arbiter: "Reserves of Contractual Relations"]

[Text] Lately an increasingly widespread form of interrelations between collectives of scientists and industrialists is the long-term business agreement on scientific and technical work. Such agreements are being concluded between scientific research, design and technological organizations on the one hand, and production associations and enterprises on the other.

Work has been conducted in this way for several years now by Volgograd Scientific Research Institute of Machine Building Technology and Volgograd Production Association for Tractor Parts and Normals, the Zhdanovtyazhmash Production Association and the Institute of Electric Welding imeni Ye. O. Paton, UkSSR Academy of Sciences, and many other scientific and production collectives. The agreements between them provide for development, creation and use of new tools and work items, and improved working processes. Their methods of organizing agreement relations ensure attainment of high results, which necessitates intense investigation of this experience.

A major feature of agreements that have been concluded is comprehensiveness and longevity. The partners are not restricted, as has formerly been the case, to mere agreement on resolution of local problems. They have scope for broad programs of cooperation that consider the entire complex of problems that might arise and that are aimed at achievement of high results.

But unfortunately it is not everywhere that the relations of research and planning-design organizations with clients are arranged on such an up-to-date level. Practice shows that most of the agreements between them hold for only one year. For example, the Nepolokovtsy Bread Products Combine concluded an agreement with the Belokholunitskiy Machine Building Plant for making high-productivity milling equipment; however, because of the necessity of determining rapidly wearing parts and components, the experimental model of the item was not shipped on time. It seems that the parties to the agreement had not stipulated the order and deadlines for testing. In this connection, in accordance with a joint decision of the ministries of the supplier and customer, the equipment had to be sent to another enterprise for durability tests. Because of

inadequacies in determining the conditions of the agreement, the order of the bread products combine has thus remained unfilled.

Materials of arbitration agencies state that deficiencies in interrelations of science with production are engendered in large measure by the fact that legislation is lagging behind the requirements of economics. At the present time the order for doing research and development is defined by a Model Statute and Exemplary Agreement (order) confirmed by the USSR State Committee on Science and Technology for 1969. These acts are not in line with general measures on improvement of the business mechanism.

One of the major inadequacies of legislation on agreements for doing research and development in our opinion is its orientation toward short-term one-time relations between the parties. This arrangement leaves room for solution of only narrow, restricted problems: development and introduction of individual machines, components and devices. At the same time, cumulative scientific potential allows us to use fundamental research as a basis for developing new technological processes on a higher level that encompass the production cycle as a whole. This gives the possibility of considerably enhancing labor productivity, increasing the output of the required product. For the scientific research institutes and design offices themselves an approach of this kind overcomes restriction of scope and dissipation of forces in science collectives. Obviously we need stable, guaranteed cooperation between the scientific and production levels based on long-term business agreements.

We must not fail to mention such an important aspect of relations between scientific and production levels as intensification of the influence of consumers on development of new technology. One-time agreements and orders limit the possibilities for this influence. It is for this reason that newly developed machines and devices are often technologically infeasible and cannot be used under the specific conditions of consumers.

Here is a typical example. The Veda Production Association developed a semi-automatic facility for feed packaging in accordance with orders from the USSR Ministry of Procurements. The equipment made a good showing in tests, but farms were unable to use the machines because they did not meet specific operational requirements. However, the additional requirements to finish the items for the association could not have been foreseen since this opportunity was not stipulated in the order.

Analysis of the content of many business agreements evidences serious shortcomings. This is primarily a matter of a lack of clarity in defining the rights and duties of the mutual parties, improper formulation, and sometimes even illegalities. Agreements concluded by various enterprises and organizations are typified by unjustified differences and lack of coordination in resolution of the very same problems.

What should be done to improve contractual relations on scientific and technical progress? Obviously it is necessary first of all to develop legislation for the possibility of concluding agreements to carry out broad complexes of jobs on updating production, on major retooling of associations and enterprises.

On the basis of generalization of available encouraging experience it is also advisable to regulate the range of major problems that must be agreed to by the parties, and to stipulate optimum methods of contractual work. It is high time to expand the rights of the parties to independent resolution of certain problems in agreements.

The resolution of the Party and the government on improving the business mechanism has stipulated completion of the transition of scientific research and design organizations to the cost accounting system of doing work based on agreements and warrant orders. Depending on the introduction of results of work done by agreements and the attained effect, economic incentive funds are formed in the organizations for rewarding their workers. Therefore it is necessary that the parties to an agreement not be limited merely to defining the scope of the work, but that they also precisely formulate the final result that is to be attained.

And one more important point is increasing the responsibility for fulfilling the agreements on developing and introducing new technology. Practice shows that the existing mechanism of property sanctions still has a weak effect on raising the technical level of production. For example there have been a number of cases where clients have made no efforts to see that suppliers eliminate flaws in documentation or experimental models at their own expense.

The system of property responsibility requires improvement. Sanctions must have a perceptible influence on relations between parties, have a real effect on the most rapid realization of developments and new technology, increase the return from introducing them. Provisions should certainly also be made for penalizing clients for deviating from the use of newly developed machines and equipment, delaying the introduction of technological processes and recommendations. Strict and consistent application of sanctions will undoubtedly help to achieve clear organization and enhancement of the efficacy of scientific and technical steps.

6610
CSO: 1814/18

CHANGES IN INVENTION APPLICATION PROCEDURES URGED

Moscow PRAVDA in Russian 17 Nov 82 p 3

[Article by Candidate of Technical Sciences A. Glovatskiy, Moscow: "Application Submitted: Problems and Opinions"]

> [Text] Each year tens of thousands of inventions are added to the State Register. Is this a good or a bad thing? The question is by no means as strange as it might seem at first glance. Particularly if we add a second question: how many of these inventions are insignificant technical solutions? It is unlikely that anybody will argue against the statement that their percentage share is too large. One of the reasons for this is flaws in the organization of work with inventors.

Scientific research institutes presently plan out for a year in advance the number of applications for projected inventions, figured on a "per capita" basis. The following wise rule is often forgotten: it is better to have fewer, but better. But if it is incorporated in the plan, the plan must be fulfilled.... Sometimes the simplest improvements are elevated to the rank of inventions, and some places inventing is departing further and further from innovation, becoming transformed into undisguised artisanship, and for some, quite frankly, into a source of easy earnings. It is not surprising that bulletins with descriptions of inventions are filled to overflowing with obvious "trivia."

On the basis of current requirements it is not a very difficult matter to obtain a certificate of invention for a given device. It is enough to make changes in a machine, instrument or device designed by others -- add a baffle somewhere, make a hole, an additional screw, a hinge.... You don't believe it? But what is there new, for example, about a tapping spout if the only difference from existing ones is the fact that the partition in it is not vertical but slightly inclined. Or how about a certificate of invention for placing a hinge between two parts? This invention belongs to the Tyumen branch of the Soyuzorgtekhvodstroy All-Union Engineering Design Institute. Its stump-puller differs from others in the fact that there is a hinge between the frame and the recoil plate.

Obviously trivial items are frequently elevated to the rank of inventions -- such as change in the configuration of a nut face, impressively designated a "fastener." Or a bicycle handlebar on which the only new thing is the fact that the clamp screw is mounted in a somewhat unusual manner....

Many such examples could be cited. In each such instance one can obtain financial reward: initially incentive payment -- 200 rubles, and subsequently more.

It is amazing how readily the State Committee for Inventions and Discoveries sometimes elevates insignificant technical solutions to the status of inventions. Formerly the term "sluzhebnaya obyazannost'" [job-related duty] was applied in appraising such innovations. Today it is being ignored. Some people, without presenting anything essentially new, ingeniously present their ideas in an invention application.

Having mastered the art of indeterminacy and the contradictory nature of the requirements of Goskomizobreteniye [State Committee for Inventions and Discoveries], and at the same time a not always high level of expertise, some people connive to obtain a certificate of invention for something which is not new at all. Here the entire trick consists in the ability to present ancient technical solutions in such a manner that they fit the vague criteria of legislative instruments. Such a device, for example, helped some people from the Donetsk Scientific Research Institute of Ferrous Metallurgy obtain a certificate of invention for an agitator which has been known since the time of the alchemists.

Or how about the invention of a hot-metal car, the platform of which is fitted with hinge-attached plates? After all, such plates, not connected by hinges, to be true, were being placed on these flatcars 20 years ago. Please do not consider it a lack of modesty if I make reference to my own experience: back in 1963 I published an article in the journal METALLURG, which not only described this device but even contained a photograph of a hot-metal car with a bottom plate on the platform. It never would have even entered my mind to apply for a certificate of invention.

As I write, I ask myself the following question: am I not citing too many examples? But how can one pass over in silence, for example, the group of scientists at the Engineering Design Institute of the UkSSR Ministry of Timber and Woodworking Industry which "invented" a method of removing leaves from felled branches! It seems that the process specifies drying the branches and waiting for the leaves to fall off by themselves. And how can we fail to mention the enterprise of staff at the North Caucasus Institute of Horticulture and Viticulture, who proposed a "new" method of caring for grapes. They established that as the main stem grows, the wire with attached horizontal vines should be raised higher off the ground.

It is appropriate at this point to recall an admonition by Peter the Great: "All projects are to be highly workable, in order not to cause the treasury unneeded expense and detriment to the homeland. Anybody who comes out with a fouled-up plan, I shall strip him of his rank and order him whipped."

Here is what happens, however: difficult scientific and technical problems which are truly of vital importance for production sometimes go for an extended time without being solved. And many significant innovations have an extremely difficult time of it making their way through the barriers of expert examination. Back in 1975 experts at the Chuvash Agricultural Institute proposed a device for moldboardless tillage, whereby the roots of weed plants would be cut at the same time. Only recently, however, was it recognized as an invention in the most important category -- "satisfaction of man's vital needs." And there are a good many instances where decades go by before applications are finally approved. As one learns from a recent inventions description bulletin, for example, it took 15 years for a "Combined Covering Panel" to be approved, while it took more than 30 years for a "Driven Pile."

And yet average statistical figures on development of mass inventing and the average time required to process applications would indicate that everything is fine. And the number of applications is increasing year by year. But fairly few of them are truly important inventions, capable of leaving an appreciable mark on production advance! Could it be that the people in the State Committee for Inventions and Discoveries are not aware of this?

Evidently they are aware, but they respond to this situation... by further complicating the process of recording and examining applications. For example, an application form must be accompanied by a declaration, a description of the invention, an agreement on distribution of possible compensation among co-inventors, an opinion that the invention is in fact new and useful, an evaluation, an expert examination report, as well as a document stating results of a patent search in a number of countries covering the last 30 years. Obviously many of these documents are not required for a preliminary examination. And a proposal may not be acknowledged to be an invention, and then the application will be placed in the files. Why then, one asks, is such a great deal of documentation needed? This also applies in equal measure to the patent search document, for even this country's large cities do not contain an adequate patent file, while the assistance of the All-Union Patent Services Center costs several thousand rubles just for a patent search document, an amount a patent applicant obviously cannot pay. And yet an application may be rejected because of an incomplete patent search. Many inventors correctly are of the opinion that one must either work or fill out applications, and frequently they choose the former.

Another new innovation is the fact that responsibility for technical level and proper document accompaniment of applications has now been assigned to the patent departments of enterprises or local councils of the All-Union Society of Inventors and Efficiency Innovators. Many of them, however, have proven unprepared to perform such a function. And yet at the State Committee for Inventions and Discoveries they hastened to free experts from the duty of helping inventors more correctly formulate the substance of inventions, protecting the prior rights of the state. I feel that this has cost us a great many "pearls" in the applications of many local Kulibins and Polzunovs.

Do these paradoxes not serve as a cause for grumbling by inventors, who have inundated the editorial offices of magazines and newspapers with complaints?

What should be done to improve things?

In our opinion it would be beneficial to change the regulations on socialist competition at enterprises and establishments, allocating one of the most important places to major, highly-effective inventions, sale of licenses, etc. And planning on the basis of number of patent applications "per head" should be abolished, for in the final analysis we wish -- this task was specified at the 26th CPSU Congress -- to bring all branches and sectors of the economy to the cutting edge of science and technology. Therefore the efforts of inventors should be focused on solving key problems pertaining to the economy, on discoveries capable of producing genuinely revolutionary changes in production.

It would evidently be useful to subdivide inventions by technical level into several (I shall not suggest how many) categories.

The first category might cover "methods" -- previously unknown industrial processes which determine entire areas of future development of a given branch. For example, a method of producing synthetic diamonds. Such technical solutions will comprise the golden fund of the "Soviet ideas bank."

The second category would include additions and refinements to inventions in the first category, providing a sharp increase in production and product quality. If proposals improve things which have already been developed abroad or in this country and are superior in technical-economic indices, they can be assigned to inventions of the third and fourth categories respectively. When they represent improvements on ideas made public long ago but which have remained on paper, they can be assigned to an even lower category. Inventions of substances should be lower in significance, by virtue of the infinite variety of possible variations in composition and content of components, for it is precisely this diversity which most frequently leads to an increase in the number of inventor solutions of little significance.

Top-category "device" inventions should include only large items, such as new types of machine tools, machinery, equipment, etc. Individual assemblies, components and attachments for these items should be assigned to a less important status. Improvements made in already existing devices will then possess less significance.

A clear-cut gradation would make it possible to introduce improved criteria for evaluating the performance of many establishments and the inventors themselves, and to induce them to give thought to the actual value of their inventing and the level at which they solve technical problems. In conformity with this it would be correct to differentiate payment of remuneration, reducing the maximum amount with a lower technical level of inventions. I believe that we should abolish payment of incentive reward just for coming up with an invention. This will sharply reduce the flow of applications submitted solely for the purpose of receiving such incentive rewards. On the other hand it is high time to make responsibility for the creation of phony inventions rest equally on the inventors proper and their "co-inventors" among the expert examination and verification services of the State Committee for Inventions and Discoveries. Then a solid barrier will be placed against such "innovations."

I am convinced that Soviet scientists, inventors and efficiency innovators are capable of much more productive performance if the many deficiencies in organization of technical innovation would be eliminated.

3024
CSO: 1814/55

MATERIAL INCENTIVE TO INVENTORS APPRAISED

Moscow EKONOMICHESKAYA GAZETA in Russian No 45, Nov 82 p 19

[Article, published under the heading "Letters to EKONOMICHESKAYA GAZETA," by S. Bereslavskiy, honored inventor of the Mari ASSR: "Where Does a Bonus Direct the Focus?"]

[Text] Questions pertaining to material incentives to stimulate and promote inventing activity continue to retain their relevance. In spite of the fact that important decisions have been made in this area, at a practical level one still encounters serious deficiencies, caused chiefly by failure adequately to understand existing regulations.

The law specifies payment of compensation to the author of an incorporated invention, in the amount of 2 percent of annual savings during the first five years of its utilization, but not more than 20,000 rubles for each invention.

Unfortunately the payment of financial reward for economic effectiveness, which indeed provides incentive for inventors to invent more highly productive and less expensive equipment, in actual practice is replaced by payment of financial reward for so-called "actual value," determined on the basis of factors which are of a highly approximate character, which by no means fosters increased efficiency of inventions. This is done not because there is in fact no possibility of correctly evaluating the economic effectiveness of such inventions but simply because these possibilities are not utilized.

Unfortunately the tone in this matter is set by the Administration for Protection of the Rights of Inventors and Centralized Payment of Compensation (UTsVV) of the USSR State Committee for Inventions and Discoveries. According to the experience of this administration, approximately 80 percent of all inventions have proven to generate no economic effect, which we of course believe is not in agreement with figures on effectiveness of new equipment developed on the basis of inventions.

The same thing happens in the ministries and agencies. At Glavstroymekhanizatsiya of the USSR Ministry of Transport Construction, new equipment developed by design offices as a rule is economically effective, but when new equipment is put into series production and bonuses are paid for the new equipment, they prefer to pay inventors according to "actual value."

It is usually stated in justification for this situation that it would allegedly be necessary to pay a great deal to inventors for economic effectiveness. It is possible that the compensation scale indeed needs revising. But one thing is clear: it should be firmly linked to economic effectiveness, for otherwise compensation ceases to play the role of that incentive on which we are figuring. As regards so-called "actual value," such a method of evaluating inventions should be applied in exceptional cases, when determination of economic effect is in fact impossible....

Also of great importance is proper incentive to assist inventing. At the present time enterprises are allocated for this purpose 1.5 percent of annual savings during the first year of utilization of an invention, with an additional 0.4 percent designated for the ministry. For inventions which do not produce savings, 35 percent of the money spent on financially rewarding inventors is allotted for bonuses.

As we see, these are considerable funds. But unfortunately they are being utilized far from effectively. As a rule, they are used to form enterprise and ministry funds which are expended (yes, expended!) not for paying bonuses for assisting in the incorporation of specific inventions but for assisting inventing activities in general, based on results for the quarter, half year, etc.

Obviously it is more expedient to utilize bonuses of this type more specifically, separately for each invention, precisely specifying bonus amounts, proceeding from economic effectiveness.

3024
CSO: 1814/55

ARMENIAN ACADEMY OF SCIENCES CELEBRATES USSR 60TH ANNIVERSARY

Yerevan KOMMUNIST in Russian 13 Oct 82 p 2

[Armenpress article: "The Lighted Path, General Meeting of the Armenian SSR Academy of Sciences Marks 60th Anniversary of the Formation of the USSR"]

[Text] There are events in the history of every people which are of lasting significance for that particular nation. In the life of all Soviet peoples, the formation of the USSR, the glorious 60th anniversary of which our entire country is celebrating, is one such event.

When we look at the historical destiny of the Armenian people, for example, the triumph of the proletarian revolution and the formation of the USSR has been of particular significance for it. It was in fact only the Great October that stayed the sword drawn over its head and threatening it with physical annihilation, while the formation of the USSR once and for all eliminated from the life of the Armenian people the very possibility that such a thing could ever happen again. The indestructible Union of Soviet Socialist Republics and its steadily growing economic and military strength has been, and remains, a guarantee of peace and creative labor for all Soviet peoples, including the Armenian people.

The past 60 years have seen Soviet Armenia continuously rise to new heights of economic and social development and to the very pinnacles of science. This was noted at the general meeting of the Armenian SSR Academy of Sciences marking the 60th anniversary of the formation of the USSR, which began its work in Yerevan on 11 October.

Comprising the presidium were B. Ye. Sarkisov, G. N. Andreyev, G. M. Voskanyan and V. B. Galumyan; A. M. Kirakosyan and R. Kh. Svetlova, deputy chairmen of the Armenian SSR Council of Ministers and Ye. K. Kharadze, president of the Georgian SSR Academy of Sciences and corresponding member of the USSR Academy of Sciences.

Academician V. A. Ambartsumyan, president of the Armenian SSR Academy of Sciences and twice Hero of Socialist Labor, opened the meeting.

The October Revolution, he declared, is rightly considered the greatest event of the 20th century. It eliminated class oppression and the exploitation of the popular masses and opened the way for the building of a just socialist society.

Soviet Armenia, which rose from the fire and ashes of the war of 1914-1920, constitutes one of the most brilliant examples of the realization of the Communist Party's national

policy. The existing inequality among the nations in levels of social-economic and cultural development could have been a serious obstacle to the cause of the building of socialism. The existence of this disparity contradicted the very spirit of Lenin's nationality policy, which was directed toward establishing true equality between all the country's nations and nationalities and intended to promote their growth and development and to bring them more closely together. This is the reason the course he charted toward the elimination of this inequality became one of the most important aspects, an integral aspect, of the general line of the party. Thanks to assistance rendered by Soviet Russia, all republics, and Armenia in particular, were able in only a very few years to accomplish tasks which under other conditions would have required an entire epoch.

Each of the Soviet republics, and this includes Armenia, today constitutes an organic and integral component of the great Soviet state, which under the leadership of the Communist Party is realizing the Leninist principles of social justice, spiritual progress and equality between all nations and nationalities.

"Our great state," the president continued, "was the first to travel this course, and in this lies our strength. As was pointed out in Comrade L. I. Brezhnev's speech to the 26th Congress, science is playing an ever-increasing role in our society. It is therefore natural that the party has advanced and is successfully accomplishing the important tasks associated with the organization of large-scale scientific efforts, to include basic science in all the union republics. The USSR Academy of Sciences and all Soviet scientists, particular Russian scientists, are of enormous importance for the advancement of science in Armenia, which has made great progress in recent decades.

Turning then to the organization of scientific efforts, the speaker referred to its enormous impact upon the development of the republic's industrial and agricultural potential.

Basic science will have its unique aspects from one republic to the next; that in one should not duplicate, but rather compliment the efforts under way in other republics. At the same time, however, cooperation between them and the coordination of their efforts should be improved.

The presidium of the Armenian SSR Academy of Sciences attaches great importance to practical application of the results of basic research. With this purpose in mind, work has begun and will continue on the organization of a network of design bureaus and pilot plants around the system of academic institutes.

A weak basic science, he emphasized, cannot contribute to the advancement of technical thought or to progress in industry. This means that, without divorcing themselves from everyday reality, scientists must raise the level of their basic research.

In this connection the president pointed to the vital importance of the training highly qualified personnel, of the process of selecting and educating them.

A. R. Ioannisyan, academician and vice-president of the Armenian SSR Academy of Sciences, delivered an address on the 60th anniversary of the formation of the USSR.

Today, he declared, as we look back over our history and consider the significance of our republic's success we become deeply aware of the fact that without the selfless assistance of the Russian people and of all the other peoples of our great country we would not have been able to achieve this success.

Soviet Armenia inherited from the past an agriculture that was in utter ruin. In consequence of consistent implementation of a Leninist agrarian policy, the period since the establishment of Soviet power has seen the working people of Armenia by their own selfless labors turn this republic industry into a highly developed sector of its economy which has fundamentally transformed the Armenian countryside. Implementation of the Food Program, the speaker emphasized, an effort in which workers in our republic are actively participating as well, will raise its agricultural production to new levels.

Soviet Armenia's achievements in the field of industrial development have been particularly significant. The industrialization of the republic has brought it to unprecedented levels. Armenia today stands as an industrial republic having enormous industrial-engineering potential and as an important component in a single national economic system. The republic ships its products to all economic regions of the Soviet Union.

One of the most dramatic demonstrations of the fraternal mutual assistance the peoples of the Soviet Union render one another consists in the fact that all our country's major construction projects are taking shape at the hands of labor collectives international in composition. Representatives of our republic are working shoulder to shoulder with those of other peoples of the Land of Soviets, for example, on the Baykal-Amur Mainline, in Tyumenskaya Oblast and Ust'-Ilimsk, on the Atommash and many other of our key construction projects. Representatives of many of our country's nationalities have in turn been actively involved in the construction of such projects of vital importance to our republic as the Yerevan TETs, the Vorotanskiy stage of the GES, the Razdanskaya GRES, the Armenian atomic power plant and the Arpa-Sevan tunnel. Today the construction of the Yerevan subway, the Idzhevan-Razdan railway and a number of other projects is being undertaken with the hands of multinational labor collectives.

The years of Soviet power have seen enormous improvement in the level of public education, the beginning and rapid development of modern scientific thought and great success achieved in the artistic culture of the Armenian people.

The exceptionally rapid rates at which the economy and public education have developed have made it both possible and necessary to transform Armenia into a major scientific country.

The history of the advancement of science in our republic is still another dramatic illustration of the importance of the creation of the USSR, of the fraternal solidarity of the peoples of our country and the mutual assistance they render one another. Despite the Armenian people's rich scientific traditions, particularly in the field of the social sciences, the flowering of science in Soviet Armenia, in, among others, the fields of the natural and technical sciences, such as we are now seeing would simply have been inconceivable without all-round assistance and collaboration on the part of scientific institutions in Moscow, Leningrad and other of the country's scientific centers.

We are proud in our knowledge of the fact that Armenian scientists are today active participants in scientific research at the leading edge of scientific-technical and cultural progress and that together with scientists from other fraternal republics they are making a worthy contribution to the all-round development of Soviet science as a whole.

G. A. Galoyan, academician of the republic Academy of Sciences and academican-secretary of the Armenian SSR Academy of Sciences, delivered an address entitled "The Role of Soviet Russia in the Collapse of the Imperialist Plans of the U.S. and the Entente for Armenia." On the basis of newly discovered archival materials he demonstrated the reality of plans for the physical annihilation of the people of eastern Armenia during the period of foreign intervention and civil war, when all Transcaucasia found itself under occupation by German and Turkish forces, then by the imperialist Entente. But at this critical point for tormented Armenia, worker-peasant Soviet Russia came to her assistance, Soviet Russia, whose courageous sons, led by the Communist Party, destroyed the interventionists, who had encroached upon the freedom and independence of the mountain land.

Drawing upon a wealth of factual material, here for the first time presented to scholars, the speaker revealed the aggressive counterrevolutionary plans of the Entente imperialists, who in attempting to usurp the Transcausus, were pursuing the objective of tearing it away from Soviet Russia and transforming it into its colony. He presented numerous facts attesting to this.

Dwelling in detail upon the events of the fall of 1920 and painting a picture of the difficult life of the people, the speaker showed the true aims the Turkish nationalist were pursuing in invading Armenia, the involvement of the imperialist states of the Entente and the U.S. and the Kemalists' attempt to seize eastern Armenia. At a critical hour for the Armenian people the leaders of the Dashnak party conducted an antipopular policy. By rejecting the aid Soviet Russia had offered in stopping any further penetration of the country by the invading Turkish army, Dashnak party leaders were instrumental in increasing the danger of turning eastern Armenia into an arena of bloody battle. Basing himself on persuasive factual documentation, the speaker also described the role the Entente powers played in the Dashnaks' conclusion of the antipopular Treaty of Aleksandropol.

Imperialist circles were hatching more plans for Armenia. These plans were disrupted, however, by the people with the fraternal assistance of Soviet Russia.

On 29 November 1920, the workers and peasants of Armenia overthrew the Dashnak government and proclaimed Soviet power. At this decisive hour the great Russian people once again extended the hand of assistance.

The working people of Armenia were not disappointed in their hopes and expectations. They were once again persuaded of the historical fact that the friendship between the Armenian and Russian peoples, a friendship that had lasted down through the centuries, was being strengthened and that the Great October Socialist Revolution had added new content and new strength to this friendship. These are the lessons of history.

Establishment of Soviet power also fundamentally altered the relationship between the imperialists of the Entente and Kemalist Turkey and Armenia. She was no longer to be

an object to be exploited in buying and selling. Ruling circles now realized that Armenia was not defenseless. Now at her side stood Soviet Russia and the peoples of our multinational motherland. And today, within the fraternal family of Soviet peoples, our republic leads a free life, creating and building in the name of the bright future of communism.

8963
CSO: 1814/28

ESTONIAN ACADEMY OF SCIENCES PROGRESS REPORT

Tallinn SOVETSKAYA ESTONIYA in Russian 2 Dec 82 p 1

[Estonian News Agency (ETA) news report: "New Scientific Achievements"]

[Text] A general meeting of the Estonian SSR Academy of Sciences was held in Tallinn on 1 December. A report on the activities of the presidium of the ESSR Academy of Sciences for the period 1977-1982 was presented by K. Rebane, president of the ESSR Academy of Sciences and corresponding member of the USSR Academy of Sciences.

The presidium, just as the republic Academy of Sciences as a whole, was guided in its activities by the decisions of the 25th and 26th CPSU Congresses and by party and government instructions, he stated. Scientific research was carried out in an orderly manner, and research results are being increasingly more extensively utilized in the various branches and sectors of the economy and are strengthening our country's economic and scientific potential.

The presidium of the ESSR Academy of Sciences devoted considerable attention to selection of scientific research topics, particularly in the area of basic research. Utilization of the advanced know-how amassed at the institutes of the ESSR Academy of Sciences, skillful placement of personnel, and efficient utilization of scientific equipment have made it possible to achieve major success in solving many problems. Considerable reserve potential is presented by thorough planning of scientific research and coordination of the activities of all the institutes and organizations of the republic Academy of Sciences.

Enumerating the principal problems facing Estonian scientists, K. Rebane named performance of work pertaining to carrying out the Food Program and further development of power engineering based on fuel shale.

Discussing the budget of the Estonian SSR Academy of Sciences, the speaker noted that it has been steadily growing -- it has increased by one fourth in comparison with 1977. The plan pertaining to self-financing contract work performed by scientists has been overfulfilled year after year. Additional funds were allocated to a number of institutes for expanding the scientific research subject matter and strengthening facilities. This makes it possible to concentrate efforts on those areas which are the most promising and important for science and the nation's economy.

The level of qualifications of scientific personnel of the ESSR Academy of Sciences is improving. In the last 5 years 26 persons have defended doctoral dissertations -- one third of the total number of doctors of sciences in the ESSR Academy of Sciences. For the most part these are young scientists.

The scope of construction work is broadening -- facilities coming on-stream during the period under review included a computer hardware special design office building at the Institute of Cybernetics, additional buildings for that institute, an addition to the ESSR Academy of Sciences special design office, plus many others. Working and living conditions are improving for academy personnel. Much has been accomplished in this area: a 300-seat dining facility is opening in the Tallinn-Mustamyae area, where many establishments of the ESSR Academy of Sciences are concentrated. But in order for the scientific complex at Mustamyae to become a genuine academy scientific research center, more efforts must be focused on improving services and amenities and on providing institute and design office personnel with everything they need. The matter of an ESSR Academy of Sciences recreation facility has not yet been settled.

Following discussion of the accountability report, an appropriate resolution was adopted.

A conferral ceremony was held, to award the rank of professor, doctoral diplomas, and certificates of merit of the ESSR Academy of Sciences and trade union of workers in public education, higher education and scientific establishments of the ESSR. An ESSR Academy of Sciences Medal was awarded to L. Kayk, chairman of the ESSR State Committee for Publishing Houses, Printing Plants and the Book Trade, for meritorious services in the publishing activities of the ESSR Academy of Sciences.

Organizational matters were settled.

USSR Academy of Sciences Corresponding Member K. Rebane was reelected to the position of president of the Estonian SSR Academy of Sciences.

ESSR Academy of Sciences academicians A. Keyerna and I. Epik were elected to the position of the vice-presidents of the ESSR Academy of Sciences.

ESSR Academy of Sciences Corresponding Member R. Khagel'berg was elected chief scientific secretary of the Presidium of the ESSR Academy of Sciences.

R. Ristlaan, secretary of the Estonian Communist Party Central Committee, and A. Aben, head of the science and educational institutions department of the Central Committee of the Estonian Communist Party, took part in the general meeting of the ESSR Academy of Sciences.

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GEORGIAN SCIENTIFIC, TECHNICAL INFORMATION SYSTEM ANALYZED

Tbilisi ZARYA VOSTOKA in Russian 16 Nov 82 p 4

[Article, published under the heading "Horizons of Science," by Candidate of Technical Sciences Sergey Dadunashvili, deputy director of the Georgian Scientific Research Institute for Scientific and Technical Information and Technical-Economic Research: "The Republic's Information Infrastructure"]

> [Text] The need for improving existing organizational structures and, correspondingly, adopting advanced management methods has been stressed time and again. In particular, it has been noted here that when the subject under discussion is increased effectiveness and efficiency of information service, one should proceed in the direction of establishing a powerful information agency equipped with modern information technology and with a high degree of automation and mechanization of information work.

The significance of information is determined not only by physical volume but also by its purpose and nature. On the scale of the national economy, which operates on a planned basis, information assumes great organizing significance. It becomes one of the means which bind together all the elements of the economic mechanism into a single, unified complex. This applies first and foremost to management information. Accomplishment of practical tasks connected with formulating plan objectives, determining a program for attaining the goal, formulation of optimal decisions, organization of their execution, performance of oversight, and determination of results -- everything is based on a continuous movement of information.

Growing information requirements for accomplishing diversified tasks dictate expansion of the domain of information activity. In connection with this there is taking place a qualitative change in the role of enterprises and organizations taking part in support information. They are beginning to form a so-called information infrastructure.

Specification of and the character of the information infrastructure is grounded on that specific feature of information that it does not lose its content during utilization. The possibility of multiple utilization of information makes centralization of the processes of its storage and processing efficient.

Corresponding dispersal of information agencies is required in connection with this.

An information infrastructure is of a network nature in its organizational arrangement. The network includes an aggregate of interlinked elements joined by a common organization service and common operating mode. The process of network formation of an information infrastructure is being continuously improved and encompasses an increasingly larger scale by means of linking up various elements and increasing their capabilities to provide information services. As a result information activities become increasingly more systemic and comprehensive in subject, methods of execution, and organization being serviced, which is very important.

The formation of network structures is fostered by the merging of related areas of technology -- communications, microprocessor, and computer technology.

A tendency toward network development, utilization of modern information technology, and placement of all branches of the information infrastructure onto a modern technological foundation create an objective basis for ending monopolies of knowledge, lead to acceleration of the pace of scientific and technological advance, foster an increase in the productivity of the creative labor of scientists and specialists, mobilize their experience and initiative at all levels into a unified process, and foster rapid adoption of scientific and technological advances into production.

It is logical to ask how information services are provided in this republic.

The republic scientific and technical information (NTI) network is formed of the Georgian Scientific Research Institute for Scientific and Technical Information and Technical-Economic Research (GruzNIINTI), NTI departments (offices) of associations, enterprises and organizations of all-union and republic subordination, as well as corresponding specialized, scientific and technical libraries.

At the present time there are 281 NTI services in this republic. There are 214 in Tbilisi, 12 in Kutaisi, 11 in Sukhumi and Batumi, 7 in Rustavi, 4 in Poti, 3 each in Makharadze, Gori, and Zestafoni, 2 in Telavi and Khashuri, and 1 each in Abastumani, Akhaltsikhe, Borzhomi, Gardabani, Zugdidi, Kaspi, Kobuleti, Marneuli, and Chiatura.

GruzNIINTI performs the functions of lead scientific-methods organization for NTI in this republic. As a lead organization, GruzNIINTI collects, analyzes, evaluates, compares, and synthesizes scientific and technical achievements pertaining to the topic areas of the main directions of development of this republic's economy. These activities are performed for the purpose of obtaining data essential for determining development trends in the respective areas of science and technology, drafting of recommendations on solving the principal problems of development of the republic's economy and practical utilization of scientific and technological achievements. On the basis of analysis of information needs -- individual, group, aggregate -- the obtained data are communicated to scientific and technical information users.

The primary elements form the foundation of the information infrastructure. These are unique nodes of activity within the structure of the network. They should provide associations, enterprises and organizations, as well as scientists, specialists, innovators and leading-performance production workers with the scientific and technical information needed for their activities, in a prompt and timely manner, purposefully and fully.

Information on scientific and technical achievements and advanced production know-how is derived from published Soviet and foreign materials and from unpublished sources on scientific research, design, and experimental design activities. An important role here will be played by work performed by GruzNIINTI to establish a unified republic reference information fund. Completion of work in this area will make it possible efficiently to utilize the information assets of this republic's organizations and enterprises which are presently not interconnected.

The basic structural principle of a unified republic reference information fund is the principle of coordination of assembling the collections of scientific and technical libraries and NTI agencies, which will make it possible to increase the completeness and information capacity of the unified collection, to reduce unwarranted growth of collections, and to ensure efficient expenditure of government funds on the acquisition, storage and communication of Soviet and foreign sources of information to the information consumer. A unified republic reference information fund is a most important integrating factor in the information infrastructure.

A most important function of a lead republic agency is securement of coordination with all-union and central branch NTI agencies of the union republics. Thus the republic infrastructure is part of the state (all-union) scientific and technical information system.

In the future the republic system will fully provide the following basic types of services: responses to requests, issuing of copies of documents, literature, translation of foreign-language texts, preparation and publication of information materials, provision of copies of descriptions of inventions for patent files, provision of reference information files, and copying of blueprints and design documentation on request.

For the present information activities are obtaining a technical foundation which is adequate to the tasks facing it and the present level of science and technology. As modern information technology is incorporated and all branches of the republic information infrastructure convert over to a modern technological foundation, the capability is being developed to connect into the nation's network of automated NTI centers.

This network comprises an aggregate of information agencies of different levels, located in various cities throughout the country, organized with the assistance of subscriber terminals, communications channels, and data transmission equipment into a unified technical complex.

A most important condition for the operation of a network of automated NTI centers is the arrangement of regular formation of data bases on machine-readable media, since without them NTI centers linked into the network cannot provide reference information service at the required time and with the required completeness.

GruzNIINTI is presently hooking up its subscriber terminals to the data bases of the All-Union Scientific and Technical Information Center. These bases, which include reports on scientific research projects, explanatory notes on experimental design projects, defended dissertations, and description of algorithms and programs collected on a nationwide scale, are of enormous interest to this republic's specialists. Automated access to these bases, which are in the memory of computers operating in Moscow, opens up completely new possibilities of information services in this republic. In order to have experimental access runs this year, the institute urgently needs the assistance of the republic Central Telegraph Office. The established networks of information-computer centers equipped with unified-series electronic computers, achievements in the area of developing new data-carrying media, and establishment of a unified automated communications network, including high-speed telephones, telegraph and TV communications channels, form the elements of an international information infrastructure. This results in capability for recording, storing, reproducing, and transmitting unlimited volumes of information to any destination, which constitutes a basis for increasing global communications capability.

A result of automation as such is not the elimination of human labor but a profound change in its character. Automation of information services is developing into a dialogue form of interaction between information users and computers, which greatly improves the quality of scientific and technical, administrative and management decisions, making them better substantiated. And this is taking place to the degree to which new information processing equipment is combined with new technology, organization and methodology of scientific and technical activities and management.

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GEORGIAN SCIENTIFIC AND TECHNICAL SOCIETIES

Tbilisi ZARYA VOSTOKA in Russian 22 Oct 82 p 2

[Article by unidentified ZARYA VOSTOKA correspondent: "Advocates of Scientific and Technical Progress"]

> [Text] The 6th Congress of Georgian Scientific and Technical Societies convenes today in Tbilisi. The following are statements made by congress delegates to a ZARYA VOSTOKA correspondent.

Zonana Lordkipanidze, Scientific Secretary of the Georgian Republic Council of Scientific and Technical Societies:

The Sixth Plenum of the Georgian Communist Party Central Committee, which marked the beginning of decisive improvement of party guidance of science and scientific-technical progress, constituted an important stage in the activities of the Georgian Republic NTO [Scientific and Technical Societies] Council, republic branch boards, oblast councils and NTO boards. A concrete and long-range program of further activities of Georgia's NTO was formulated on the basis of its decisions.

In recent years the center of attention of NTO has been focused on implementation of specific-purpose combined scientific-technical programs and programs for solving the most important scientific and technical problems. A specific-purpose combined program for mechanization of manual labor in the economy of the Georgian SSR in 1981-1982 was drawn up with the active participation of the NTO. NTO primary organizations have devised a clearly-defined system of public oversight and are making every effort to foster execution of each and every point of this program. As a result, measures specified for 1981 have for the most part been carried out. In addition, approximately 130 supplementary measures pertaining to mechanization of manual labor have been implemented.

The 10th Plenum of the Georgian Communist Party Central Committee focused attention on the need to design and build equipment, especially for the needs of mountain agriculture. This republic's NTO should make a weighty contribution toward resolving this problem.

The party attaches enormous importance to the activities of the scientific and technical societies, and t h i s means that it is the duty of the NTO skillfully to guide the innovative search efforts by the scientific and technical community, to develop the inquisitive thinking of the members of scientific and technical societies, to increase their activeness, and to expand publicity of scientific and technical achievements as well as advanced know-how among the masses....

Georgiy Tsobekhiya, Chairman of the Abkhaz ASSR Oblast NTO Council:

In 1981 the city's enterprises manufactured 16.3 million rubles worth of top-quality goods. With a targeted 8.2 percent, the percentage share of product bearing the honored pentagon was 8.9 percent of total production volume. And this indicator has risen to 36.9 percent of certified production. Production workforces also achieved good results in 1982. In the first half year above-target goods bearing the honored pentagon mark amounted to almost one and a half million rubles in value.

It has become possible to achieve excellent results thanks to purposeful work and a combined approach to solving the problem of improving quality. The vanguard role here is played by leading-performance workers, production innovators, and NTO activists. Specific plans of measures have been drawn up at all industrial enterprises with their extensive participation; execution of these measures makes it possible to improve qualitative indices and to increase manufacture of top quality category goods.

Good results in efforts to improve the quality of manufactured goods are being achieved by the workforce of the Sukhumpribor Plant. Chief process engineer and chief mechanical engineer services have been set up at this plant. A technical department has been established, based on these services, the functions of which include technical preparation of production for bringing new products into production, as well as adoption of new technology and advanced manufacturing processes. A process engineering and design department has also been established at the plant. Considerable credit for this goes to the NTO primary organization, which looks for possibilities of further improving production, increasing production efficiency, and improving product quality.

Ziya Shavishvili, Chairman of the Adzhar ASSR Oblast NTO Council:

In 1977 the NTO organizations of Adzharia came out with the initiative "Each NTO Council -- A Headquarters for Searching out Production Reserves," which was given approval by the Georgian Communist Party Central Committee. Dissemination of this initiative in the autonomous republic's NTO primary organizations produced good results. Additional reserve potential was determined for increasing production and boosting labor productivity.

Achieving savings in labor, material, and fuel-energy resources occupy the center of attention of NTO organization activities. At the Batumi Woodworking Combine, for example, waste is 100 percent utilized, while at the Bytmash Plant plans call for producing 1.1 million rubles worth of consumer goods this year from production waste materials, etc.

The Sixth Congress of Georgian Scientific and Technical Societies has convened at an important time: this country will soon be celebrating a holiday of international unity and solidarity -- the 60th anniversary of establishment of the USSR. The scientific and technical community of Adzharia, brought together in NTO, is multinational in composition. And each and every member of the NTO will do everything necessary in order to honor this event in a worthy manner, making a contribution to the cause of strengthening the economic might of the homeland.

Svetlana Kotayeva, Scientific Secretary of the South Ossetian Oblast Board of the Scientific and Technical Association for Agriculture:

Participating in accomplishing economic and social tasks, the NTO promote utilization in production of scientific and technological advances and, on this basis, increased labor productivity, efficiency and improved work quality. In connection with this an especially important area of NTO activity is increasing the qualifications of specialists. One way to achieve this is the work done by schools of advanced know-how and organization of courses of instruction and seminars on the most critical problems pertaining to increasing production efficiency and development of science and technology. Competitions for the title "Best in Profession" are held in our autonomous oblast. Scientific learning trips to leading farms are arranged, where one can become acquainted with work experience and know-how and adopt progressive labor methods. We also attach great importance to the forms of propaganda in the area of scientific and technological advances. All this makes it possible successfully to campaign for implementation of the decisions of the 26th CPSU Congress and the 26th Congress of the Georgian Communist Party.

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GEORGIAN CONTRIBUTIONS TO NEW TECHNOLOGY

Tbilisi ZARYA VOSTOKA in Russian 4 Jan 83 p 2

[Interview with Sergey Vasil'yevich Durmishidze, vice-president of the GSSR Academy of Sciences, by ZARYA VOSTOKA correspondent Ketevan Amiredzhibi, published under the heading "Achievements of Science and Technology to All Branches": "The Contribution Will Grow"]

> [Text] The scientists and staffs of the scientific research establishments of the Georgian SSR Academy of Sciences system are to make a large contribution toward the further development of science and acceleration of scientific and technological advance in the third, core year of the 11th Five-Year Plan. In connection with this a ZARYA VOSTOKA correspondent asked Georgian Academy of Sciences Academician Sergey Vasil'yevich Durmishidze, vice-president of the GSSR Academy of Sciences, to reply to a number of questions.

[Question] At the November (1982) CPSU Central Committee Plenum and at the Sixth and Ninth Georgian Communist Party Central Committee Plenums particular stress was placed not only on the need to accelerate scientific and technological advance but also to achieve rapid adoption of scientific and technological advances as well as advanced know-how. Accomplishment of these ambitious tasks is impossible without a solid foundation. Tell me please, Sergey Vasil'yevich, about achievements by Georgian scientists which make it possible today to focus their innovative search on solving new, important economic problems.

[Answer] Of the research conducted at academy institutes or with their participation, I should like to mention projects connected with increasing the efficiency of mining and comprehensive processing of the manganese ores of the Chiatura deposit as well as efficient utilization of natural zeolites in industry and agriculture. Scientists have developed an autoclave hydrometallurgical method of producing high-grade copper powder and active manganese dioxide from Madneulskiy copper concentrates, and low-grade Chiatura manganese ore, which will make it possible to start up domestic production. A process of producing high-strength cast iron has been put into operation, as well as new methods of chemical metallization of materials, of obtaining powders of pure metals, metal alloys, etc. Scientists working in the field of cybernetics, electronics and computer technology are working on the development of cybernetic systems based

on new physical principles. Specialized computer systems are being developed for automated industrial process control systems in the metallurgical, mining and chemical industries and for automating thermal and nuclear electric power stations. Through the joint efforts of the staffs of the Georgian Academy of Sciences Institute of Control Systems, the Avtomatprom All-Union Scientific Research Institute, and the workforce at the Pervouralsk Novotrubnyy Plant, the world's first adaptive system of controlling tube rolling processes has been developed. A weighty contribution to the development of science and scientific-technical progress is being made by the staffs of branch scientific research institutes, departments of higher educational institutions, design and engineering design organizations which, working in close cooperation with the people at industrial enterprises, in construction, agriculture, and other sectors of the economy, are conducting research within the framework of republic combined programs. In addition to the development of basic research, in recent years special importance has been attached to improving the efficiency of scientific activities. In the 9th Five-Year Plan, for example, savings from the adoption of scientific and technical advances totaled 125 million rubles, while in the 10th Five-Year Plan this figure exceeded 217 million rubles. Considerable savings have also been obtained in the first two years of the 11th Five-Year Plan.

[Question] It is noteworthy that the role of scientific-technical, economic, social and regional programs in accomplishing all economic and social transformations is becoming appreciably enhanced in the state plan of development of the Georgian SSR economy for 1983....

[Answer] A transition to specific-program planning of implementation of scientific and technological advances in this republic began in the 10th Five-Year Plan: 20 scientific and technical programs of two types were drawn up. Proceeding from the tasks of this republic's economic and social development, 30 scientific and technical programs were formulated in the 11th Five-Year Plan in close coordination with the State Plan; these programs constitute directive documents which promote solving of important economic programs. They have been prepared by the State Committee for Science and Technology, the republic Gosplan and Academy of Sciences, jointly with ministries and agencies. The programs encompass a broad range of research and development in the fields of industry, agriculture, health care, and development of automated control and management systems. Lead organizations and program managers have been specified for all programs, and for some tasks -- individuals responsible for execution. Material-technical and financial resources required for program implementation have been specified. In 1983 every effort will be made to ensure that the specific-purpose program method, as was stressed at the Sixth Plenum of the Georgian Communist Party Central Committee, becomes more effective, efficient, and viable. As a result annual savings from utilization of scientific and technological advances will total approximately 90 million rubles. This is 38 percent more than in 1982. Scientific and technological advance will ensure labor productivity growth, industrial robots and manipulators will be brought on-line, and there will be a decrease in the percentage share of workers engaged in manual labor.

[Question] What project results achieved at scientific research establishments of the Georgian SSR Academy of Sciences system will be adopted in the economy in the new year?

[Answer] Specialists at the GSSR Academy of Sciences Institute of Mining Mechanics have developed an efficient process for the mechanized mining of manganese ore with optimal preparation of areas to be excavated. Adoption of this process just in one section will generate savings of approximately 200,000 rubles. Research has also been conducted on efficient quarrying processes with modernization of quarrying operations. Savings from adoption of this process will total 150,000 rubles. Mining-specialization scientists have developed methods of forecasting and increasing the service life of hydraulic transport system lines, and standard documents have been drawn up. Savings from practical adoption of these methods will total 500,000 rubles. Adoption of another development is proposed -- quarrying machines with circular cutters, etc. Specialists at the Georgian Academy of Sciences Institute of Metallurgy are incorporating a number of new developments. Working jointly with the Zestafoni Ferroalloys Plant, they have developed a composition and process for producing a new complex silicon-manganese-titanium alloy. Spent titanium cathodes, which were previously considered waste material, are utilized in producing this alloy. Extensive certification testing of this alloy in steel production at the Rustavi Metallurgical Plant has made it possible to improve the quality of steel pipe. This alloy will be extensively adopted in 1983. This will generate annual savings of 350,000 rubles. Georgia contains an arsenic ore deposit. Metallurgical scientists have set for themselves a task of developing a process of obtaining highly-pure metallic arsenic from the arsenopyrite ore of the Tsanskoye deposit, at the same time solving the problem of protecting the environment. Demand for this material will be increasing in view of the present rate of development of such new branches of the economy as electronics, radio engineering, etc. This process has already been certification-tested on a commercial scale at the Tsanskiy Mining-Chemical Plant of the Gruzgornokhimprom Production Association. Extensive commercial adoption of this process will take place in the new year. Important practical results have also been obtained by scientists at a number of other scientific research establishments in this republic. The Georgian SSR Academy of Sciences Instiute of Plant Biochemistry, for example, has produced a carotinoid preparation from mutant bacteria and has developed a process for the commercial manufacture of this preparation. Use of this preparation as a feed additive improves the quality and increases the quantity of meat. Production experiments have already shown that utilization of 45 kilograms of this preparation for 3 million broilers will produce savings of two and a half million rubles. Construction of an experimental factory for the manufacture of carotinoids will begin in 1983. I have cited just a few examples of scientific developments adoption of which is anticipated in 1983. A total of more than 100 scientific developments will be adopted into the economy. In my opinion the number could even be much greater, but certain deficiencies in the existing planning system present obstacles.

[Question] In what aspects in your opinion is it necessary to improve the existing system of planning the practical adoption of scientific research project results into the economy?

[Answer] I believe first of all that the process of practical implementation of scientific and technological advances should be viewed as a most important indicator of the activities of enterprises. Development of such a form of integration of science with production as partnership, which presumes broad initiative and a bold, innovative approach to things, also making it possible to strengthen the material and technological foundation of science proper, should also promote the rapid practical implementation of scientific research results. Close attention was focused at the Sixth Plenum of the Georgian Communist Party Central Committee on this form of strengthening contacts between scientists and production people. This republic already contains examples of integration of science with production within the framework of a partnership. At a general meeting of the Georgian Academy of Sciences, for example, scientists from the Institute of Physical and Organic Chemistry imeni P. G. Melikishvili pledged to establish closer contacts with production people. A partnership agreement between the institute and the agroindustrial association of Kaspskiy Rayon in the Georgian SSR was signed and ratified. It was demonstrated by preliminary experiments that application into the soil of a special, very inexpensive preparation based on natural zeolites -- clinoptilolite tuffs, a deposit of which is located in Kaspskiy Rayon -- leads to a substantial increase in corn yields, an increase in biomass, and to a savings in mineral fertilizers. This preparation is also to be used to boost bean yields. A partnership agreement with the agroindustrial association of Gardabanskiy Rayon is being drafted. This partnership is placing emphasis on boosting vegetable crop yields. In 1983 the Georgian Academy of Sciences Institute of Physical and Organic Chemistry, jointly with the Gruzteplitsa Production Association, plans to employ in greenhouse growing operations, in place of costly and short-supply subsoils, a considerably less expensive and abundant mineral raw material -- ground clinoptilolite tuff. A total of 10,000 tons of natural zeolites have already been hauled to the rayon's greenhouse operations. Their cost is only slightly more than one fourth that of the subsoil presently being used. Chemists are taking over management of scientific aspects of the program in both cases.

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GEORGIAN STATE PRIZE CANDIDATES IN SCIENCE, TECHNOLOGY ANNOUNCED

Tbilisi ZARYA VOSTOKA in Russian 8 Dec 82 p 3

[Official announcement: "From the Georgian SSR Committee on State Prizes in the Area of Science and Technology Under the Georgian SSR Council of Ministers"]

[Text] The Georgian SSR Committee for State Prizes in the Area of Science and Technology under the Georgian SSR Council of Ministers reports that the following were accepted for participation in competition for the 1983 Georgian SSR State Prize:

I. In the Area of Science

1. Aleksidze, T. A.; Beradze, I. N.; Gurgenidze, R. V.; Topuriya, G. R.; Sharazhenidze, Sh. V.; and Shatilova, T. A. -- a series of research investigations: "Neurovascular Pathology of the Eye," 1960-1981. Nominated by the Tbilisi Scientific-Medical Society of Ophthalmologists.

2. Gachechiladze, G. R. (posthumously) -- "Khudozhestvennyy perevod i literaturnyye vzaimosvyazi" [Translation of Imaginative Literature and Literary Interrelations] (a monograph), Izd. Sovetskiy Pisatel', Moscow, 1980. Submitted by the Georgian SSR Academy of Sciences Institute of History of Georgian Literature imeni Shota Rustaveli.

3. Dzhorbenadze, S. M. -- "Zhizn' i podvigi Ivane Dzhavakhishvili" [The Life and Deeds of Ivan Dzhavakhishvili], Izd. Sabchota Sakartvelo, 1981. Submitted by the Tbilisi Order of the Red Banner of Labor State University.

4. Ivanitskiy, T. V. -- a series of works, "Mineralogiya i geokhimiya rudnykh mestorozhdeniy Gruzii" [Mineralogy and Geochemistry of the Ore Deposits of Georgia] (5 monographs), Izd. Metsniyereba, 1963-1980. Submitted by the Georgian SSR Academy of Sciences Geological Institute imeni A. I. Dzhanelidze.

5. Mandzhavidze, Z. Sh. (team leader); Dzhavrishvili, A. K.; Lomtadze, T. A.; Kharchilava, A. I.; and Shtayerman, A. Yu. -- "Design and Construction of a General-Purpose Streamer Chamber for Investigation of Adron-Adron and Adron-Nuclear Interactions and Its Installation at the Proton Synchrotron of the Institute of High-Energy Physics (Serpukhov) as a part of the RISK Experiment (Berlin-Budapest-Warsaw-Dubna-Prague-Sofia-Tbilisi International Cooperation),"

1977-1980. Submitted by the Order of the Red Banner of Labor Physics Institute of the Georgian SSR Academy of Sciences and the Institute of High-Energy Physics of the Order of the Red Banner of Labor Tbilisi State University.

II. In the Area of Technology

1. Abramov, S. G. (posthumously); Bedoshvili, A. P.; Gigauri, D. N.; Tskhadadze, G. O.; and Chivadze, Z. D. -- "Development, Investigation and Adoption of New, Advanced Electrical Engineering Materials, Manufacturing Processes and Structures Improving the Technical-Economic Performance of Mainline Electric Locomotives," 1971-1981. Submitted by the Tbilisi Elektrovozostroitel' Production Association.

2. Aleksi-Meskhishvili, V. Sh.; Mikashavidze, T. A.; Medzmariashvili, N. A.; Kobakhidze, V. I.; Kurtskhaliya, A. G.; Mebuke, G. V.; and Shatirishvili, F. M. -- "Design, Construction and Operation of the Tbilisi Telegraph System," 1971-1980. Submitted by the Georgian SSR Ministry of Communications.

3. Arabuli, I. A.; Akhobadze, T. V.; Kashakashvili, G. V.; Lekveishvili, S. K.; Magradze, L. A.; Petrova, V. V.; and Sigua, T. I. -- "Increasing Production Efficiency by Bringing On-Stream New Facilities (A Sinter Plant, High-Output Airtight Electric Furnaces) and Extensive Utilization of Low-Grade Manganese Concentrates and Secondary Raw Materials at the Zestafoni Ferroalloys Plant imeni G. Nikoladze," 1976-1981. Submitted by the Georgian SSR Academy of Sciences Institute of Metallurgy imeni 50th Anniversary of the USSR, and the Zestafoni Ferroalloys Plant imeni G. Nikoladze.

4. Gvineriya, K. I., and Dzhokhadze, G. D. -- a series of projects: "Pneumatic Transport Vehicle Shock Absorbers (Theory, Design, Testing, Adoption)," 1967-1981. Submitted by the Georgian Order of Lenin and the Red Banner of Labor Polytechnic Institute imeni V. I. Lenin.

5. Saralidze, G. M., and Saralidze, B. G. -- "Mechanical Extraction of Seed From Tree Seed Material," 1972-1981. Submitted by the Institute of Mountain Forestry imeni V. Z. Gulisashvili.

6. Tavadze, F. N. (team leader); Akhvlediani, L. A.; Gogoladze, G. T.; Kervalishvili, Z. Ya.; Mandzhgaladze, S. N.; Pagava, G. A.; and Tavadze, L. F. -- "Increasing the Production Efficiency of the Rustavi Chemical Plant by Development of New EP 667 Acid-Resisting Economical Alloy Steel and Custom Equipment Made of It, Simplifying the Manufacturing Process and Improving the Quality of Hydroxylamine Sulfate," 1971-1981. Submitted by the Institute of Metallurgy imeni 50th Anniversary of the USSR of the Georgian SSR Academy of Sciences.

7. Shilakadze, T. A. -- "Design, development and Adoption of a New Road Curve Configuration -- the 'Graduated Curve' on Mountain Roads in the GSSR in Order to Improve Safety and Increase Motor Transport Speed," 1971-1981. Submitted by the Georgian SSR Ministry of Highways.

III. For Textbooks and Manuals for Higher and Secondary Specialized Schools

1. Kurashvili, B. Ye. -- "Zoologiya bespozvonochnykh" [Invertebrate Zoology], Izd. Tbilisskogo Gosudarstvennogo Universiteta, 1980. Submitted by the Georgian SSR Ministry of Higher and Secondary Specialized Education.

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In publishing this list of achievements accepted for participation in the competition for the 1983 Georgian SSR State Prize in the area of science and technology, the Committee requests that the public make known its opinion both of the content of these achievements and on the composition of the submitted groups of individuals.

The Committee requests that officials of scientific and scientific-technical societies, scientific establishments, enterprises and higher educational institutions organize public discussion of these achievements and the persons nominated.

Please send comments and remarks as well as public discussion materials to the Committee before 5 February 1983, to the following address: 380008, Tbilisi, pr. Rustaveli, 52. The Presidium of the Georgian SSR Academy of Sciences, the Georgian SSR Council of Ministers Committee for Georgian SSR State Prizes. Telephone: 99-93-29, 93-88-72.

3024
CSO: 1814/57

KAZAKH SSR ACADEMY OF SCIENCES COORDINATES RESEARCH WITH INDUSTRY REQUIREMENTS

Moscow PRAVDA in Russian 8 Oct 82 p 2

[Article by special PRAVDA correspondent V. Okulov: "Science for the Work to be Done, Fact and Commentary"]

> [Text] The Kazakh SSR Academy of Sciences has set up a branch in Karaganda. Its mission is to link scientific research more closely to the needs of a large industrial region — the oblasts of Central Kazakhstan.

"We celebrate Karaganda as the mining capital of the republic," says A. Saginov, academician of the Kazakh SSR Academy of Sciences, acting branch director and rector of the Karaganda Polytechnical Institute. "But the region is rich not only in coal deposits, but in reserves of iron ores as well. Ferrous and nonferrous metallurgical enterprises are concentrated here. It's scientific potential is great as well: in Karaganda, for example, work dozens of doctors of sciences and hundreds of candidates. To unify their efforts and to orient them purposefully toward the solution of economic problems is the mission of the new branch. It comprises the Chemical-Metallurgical Institute of the Kazakh SSR Academy of Sciences, the departments of the republic academic institutes of mining and economics which have been set up in the city and a Seismology Institute laboratory. We will also include a department of the Institute of Geological Sciences. It has also been decided to combine the Karaganda and Dzhezkazgan botanical gardens and the agrobiological station in Ekibastuz and upon this basis to establish a branch of the Institute of Botany of the republic Academy of Sciences. The new branch will also act as a coordinator of collaboration between the academic scientists and those associated with our VUZs and industrial branch scientific research institutes."

The need to solve scientific problems in a more effective, integrated fashion taking into account the interests of the region also becomes clear in the course of a conversation with D. Abishev, director of the Kazakhstan Academy of Sciences' Chemical-Metallurgical Institute. I ask him to acquaint us with projects typical of the kind of work the institute is involved in. Dzhantore Nurlanovich describes research under way which is opening up the possibility of using high-ash coke instead of the low-ash metallurgical coke, which is in very short supply, as a raw product in the phosphorus production process. In fact, does it really make any sense at all to use the high-quality coke so necessary to the metallurgists as a raw material in the chemical industry? Karaganda scientists have established that the less costly, but high-ash,

coking coal can be used for this purpose. Industrial tests have confirmed the effectiveness of this practice. Personnel from the All-Union Scientific Research, Planning and Design Coal Institute and other scientific institutions have participated in this effort as well. Within the framework of the Karaganda branch of the Kazakhstan Academy of Sciences it will be easier to coordinate research like this as a unified, integrated program and to facilitate practical introduction of the fruits of scientific research.

"Reasearch, for example, like what we have undertaken at the institute in an effort to find new ways to save energy, raw materials and other resources," points out D. Abishev. "Among other things, our scientists have suggested that slag that goes to waste in phosphorous production be used to make cement. This new process has been successfully tested at the Chimkent cement plant. It not only solves the problem of waste utilization, it also cuts fuel consumption and increases the efficiency of the rotary furnaces. Utilization of this process will save a million and a half rubles within one enterprise alone. Unfortunately, however, the republic Ministry of the Construction Materials Industry is not moving expeditiously with the practical introduction of this innovation."

8963
CSO: 1814/28

ROLE OF KIRGHIZ SCIENCE IN SOVIET ECONOMIC DEVELOPMENT DISCUSSED

Moscow SOTSIALISTICHESKAYA INDUSTRIYA in Russian 4 Aug 82 p 4

[Article by M. Imanaliyev, president, Kirghiz SSR Academy of Sciences; corresponding member, USSR Academy of Sciences: "Checking Against Time"]

[Text] The science of Soviet Kirghizstan is a child of the Great October. It owes its advances and achievements to the CPSU's Leninist nationality policy, which is directed toward developing the national economies and cultures of all nations and nationalities of the USSR and toward strengthening their economic and cultural ties and fraternal collaboration in the building of a new life.

The academy is today the leading scientific center and coordinator of practically all scientific research conducted in the republic. Attention is being given primarily to increasing the effectiveness of scientific research and to the rapid introduction of it results.

Over the period of the Tenth Five-Year Plan alone, the scientific institutions of the academy, together with various ministries and departments, introduced more than 200 developments and recommendations, which yielded an economic gain of more than 80 million rubles.

Basic research in the field of mathematical theory, for example, provided a basis for solving economic problems by modeling them on a computer. We have also developed a modified model of a water distribution system required for the automation of irrigation and reclamation processes. A number of enterprises are using automatic control systems of a fundamentally new category of conversational control systems. For evidence of their effectiveness we have to look at the example of the Tokmak glass works alone, where an automated remote-data-processing subsystem for computing mixtures has made possible an annual economic gain of more than 1 million rubles.

The field of machine building has seen the efforts of scientists of our academy lead to the development of the theory of power pulse systems with hydraulic vibration converters. It became the basis for the design of an automatic casting fettling machine which has replaced the manual labor of many workers. The TsKM-1 stone-cutting machine has been developed with the objective of realizing a highly efficient new technology for extracting natural stone. The use of this machine eliminates drilling and blasting and promises to raise extraction efficiency 1.5-2-fold, cut raw material losses and to improve working conditions for those involved in the extraction process.

Republic scientists face major tasks in connection with the effort to increase the electric power-producing potential of Kirghizstan and the entire country as well. We are referring here not only to efficient utilization of the hydroelectric power potential of our mountain rivers. According to computations by experts, roughly one-half of the coal reserves in all of Central Asia are to be found concentrated in the republic. Exploitation of these reserves involves a number of serious problems, to the solution of which groups from the institutes of geology, physics and rock mechanics and science economists are making their contributions.

The idea of converting our coal to gas at the site of extraction and then transporting it to industrial centers is also of no small interest. Kirghiziya, of course, is also rich in solar energy potential, with the objective of exploiting which we have already built and brought on line our first industrial solar power plant, which is heating up to 4-5 tons of water a day.

Of no small importance for a republic with developed rare and nonferrous metal mining and processing industries is applied research in the fields of geology, inorganic and physical chemistry and chemical engineering.

Thanks to the research efforts of republic scientists we have seen the evolution for the first time in our country of a new direction in science—the production of naturally alloyed iron powder directly from the ores themselves and from the waste products of nonferrous metallurgy. Components fabricated from these powders at the Agricultural Machine-Building Plant imeni M. V. Frunze have successfully passed industrial tests.

A combined method of working ore deposits we have developed is making it possible to reduce 2-3-fold the losses and depletion associated with the changeover from open-pit to underground working and to increase work safety.

This enumeration of examples of active intervention on the part of science in the realm of practice could be extended. These past year alone has seen the introduction into industrial production operations of the results of more than 70 academy projects, which have yielded an economic gain of more than 13 million rubles.

The formation of the Union of Soviet Socialist Republics established a reliable foundation for the development and advancement of science in all republics on the basis of the coordination of efforts and the rational distribution of responsibilities. The advantages to be derived from close integration of the country's scientific forces can be graphically illustrated by the example of the USSR Food Program approved by the May (1982) plenum of the CPSU Central Committee.

Kirghiziya, with its developed livestock and crop production, has been assigned a major role in the implementation of this program. This is not only the role of supplier of agricultural products. One of the republic's tasks is to provide farms in the Russian Federation with sugar beet seeds which can help us obtain high yields and root preservability. From our specialized farms many regions of the country are also awaiting deliveries of seeds of alfalfas which will mature only in specific climatic zones. In their production will require no small effort on the part of both groups of academy biologists and branch institutes.

There can be no doubting that republic scientists will be devoting their full energies to the accomplishment of these tasks—this is what we see to be our contribution to the development of our country's economy.

8963
1814/28

LITHUANIAN SCIENTIFIC INSTITUTIONS REQUIRED TO IMPROVE THEIR WORK

Vilnius SOVETSKAYA LITVA in Russian 21 Nov 82 pp 1,2

/Unsigned Article: "In the Central Committee of the Lithuanian Communist Party and the Council of Ministers of the Lithuanian SSR"/

/Text/ The Central Committee of the Communist Party of Lithuania and the republic's Council of Minister discussed the question of "Raising the effectiveness of scientific research and strengthening the role of science in the acceleration of scientific and technical progress in the republic's economy in the light of the 26th CPSU Congress decisions."

The decree adopted by the Lithuanian Communist Party (CPL) Central Committee and the republic's Council of Ministers notes that the Academy of Sciences, the ministries and agencies, and party organizations, are implementing the decisions of the 26th CPSU Congress and the 18th CPL Congress, as well as decisions of the November (1981) and May (1982) plenums of the CPSU Central Committee on increasing the role of science in communist construction: as part of this work they are carrying out a set of planning and organizational measures aimed at further acceleration of scientific and technical progress, at broader application of the special-purpose program method of planning and management, at consolidation of the ties between science and production, at mobilization of collectives in scientific institutions, higher educational establishments, enterprises and organizations, and at the development of socialist competition for a worthy greeting to the 60th anniversary of the formation of the USSR.

The republic's scientists are making significant contributions to the development of basic and applied sciences; to the resolution of problems in power engineering, machine building, construction and the building materials industry, in radio electronics and light industry, in agriculture and in health care; to the creation and improvement of computer equipment, vibro-technology, electroplating technology and certain other areas.

There has been further development in the scientific and technical cooperation between, on the one hand, scientific institutions and VUZ's and production collectives on the other hand. There is growing cooperation among the scientists of Moscow, Leningrad, the Ukrainian SSR, the Belorussian SSR and the other union republics.

The following have been established and are functioning: the first scientific-production complexes and associations, a number of educational-scientific production associations, inter-agency scientific research laboratories.

In recent years scientists and specialists have participated actively in the establishment and start up of new, mechanized and automated assembly lines, in the comprehensive mechanization and automation of shops and work sectors, in the production of new types of machines and equipment and in the significant growth in labor productivity. All this contributes to the successful fulfilment of the basic indicators of the plans for the republic's economic and social development.

At the same time there are still significant inadequacies in the work to increase the effectiveness of scientific research and to strengthen the role of science in the acceleration of scientific and technical progress. The officials and party organizations of many scientific and production collectives still have not reorganized their work in the light of the 26th CPSU Congress and 18th CPL Congress decisions. Our scientific and technical potential is not being used yet with sufficient effectiveness to solve the most urgent problems related to the intensive development of the republic's economy. The republic's committee on scientific and technical progress is not exerting the necessary influence in this matter.

The theoretical and experimental level of the work being carried out by a number of scientific research institutions is low: there is a lack of anything which is fundamentally new or original in their findings. In the last six years seven institutes have not received a single patent.

The activities of scientific research organizations and VUZ's is still inadequately coordinated. Serious links have not been established between the departmental coordinating councils of the Ministry of Agriculture, the Ministry of Health and Gosstroy. The subject matter of the republic's plans for scientific research work does not fully take into consideration the relation between theoretical research and applied studies. One subject is worked on for four or five years at the Lithuanian Scientific Research Institute of Hydraulic Engineering and Land Reclamation, the Lithuanian Scientific Research Institute of Mechanization and Electrification in Agriculture, the Scientific Research Institute of Economics and Economic Planning, the Scientific Research Institute of Epidemiology, Microbiology and Public Health, the Vilnius State university imeni V. Kapsukas, the Lithuanian Agricultural Academy and in certain other institutes; this frequently leads to a loss of the subject matter's timeliness. Patent and license work requires fundamental improvement.

Production organizations demonstrate a low level of interest in the achievements of scientific institutions, and they do not show the necessary intiative in making practical use of these achievements. In the last six years the republic's scientific institutions have accumulated a significant share of the completed scientific projects which have been recognized by inventions or copyright but not put into practice. The participation by a majority of the scientific research institutes and branches of institutes under union jurisisdiction which are located in the republic is not active enough.

The training, selection, distribution and indoctrination of scientific and scientific-pedagogical personnel requires further improvement. The training of doctors of sciences is being carried out at a slow rate. In the 10th and first two years of the 11th Five-Year Plan not a single doctor of science was trained by the Lithuanian Agricultural Academy, the Lithuanian Scientific Research Institute of Land Cultivation, the Lithuanian Scientific Research Institute of Veterinary Science, the Lithuanian Scientific Research Institute of Hydraulic Engineering and Land Reclamation and certain others. There are no doctors of science at a majority of the institutes belonging to industrial sectors, including the Lithuanian Scientific Research Institute for Construction and Architecture, the Scientific Research Institute of Electrography, the Vilnius Scientific Research Institute of Radio Wave Measuring Instruments, and the Lithuanian branch of the All-Union Scientific Research Institute of the Butter and Cheese Making Industry.

The effectiveness of scientific research and development is lowered to a significant degree by the inadequately developed planning and design subdivisions and experimental production bases which the scientific institutions and VUZ's have. The plan for capital construction of scientific facilities is being being fulfilled in an unsatisfactory manner. There are significant inadequacies in the provision of up-to-date equipment for organizations of science and scientific services.

The gorkoms and raykoms of the Lithuanian Communist Party, as well as the primary party organizations of scientific institutions and VUZ's, do not go deeply enough into the issues of how to accelerate scientific and technical progress; they do not exert the necessary influence to increase individual responsibility on the part of scientists and specialists for the achievement of substantial scientific results from scientific research and development, for the most rapid possible utilization of this work within the national economy. There must be further strengthening of the links between the party organizations at scientific research institutes, designs bureaus and VUZ's which are developing new equipment, on the one hand, and the enterprises, where this equipment will probably be used, on the other hand.

In order to further increase the effectiveness of scientific research and development and to strengthen the role of science in the acceleration of scientific-technical and social-economic progress in the republic in the light of the requirements of the 26th CPSU and 18th CPL congresses,

as well as the decisions of the May (1982) plenum of the CPSU, the Central Committee of the Lithuanian Communist Party and the Lithuanian SSR Council of Ministers considers that further improvement in the goal directedness of scientific research and development and a higher level of results from the work of solving the most urgent scientific-technical and social-economic problems in the development of the economy constitute one of the main tasks of the Academy of Sciences, the ministries and agencies, the scientific research institutes and branches of institutes under union jurisdiction which are located within the republic.

Questions of how to improve the level of leadership in the development of science and to strengthen its ties with production constitute a very important party matter, which requires the constant attention of party and soviet organs.

The Central Committee of the Lithuanian Communist Party and the Lithuanian SSR Council of Ministers have made it mandatory for the Academy of Sciences, the Ministry of Higher and Specialized Secondary Education, for other ministries and agencies which have scientific institutions, as well as for party organizations and officials of scientific institutions and higher educational establishments to concentrate the efforts of scientists and specialists on the further development of basic research to create fundamentally new equipment and technology, and on the work of ensuring close links among basic research, applied research and development.

To raise the scientific level of the development work which is carried out by the sector scientific research institutions it is considered advisable to have no less than 10 percent of the subjects of study consist of special purpose basic research.

It is essential for the Ministry of Agriculture, the Academy of Sciences, the Ministry of Higher and Specialized Secondary Education, the Lithuanian Agricultural Academy and the Lithuanian Veterinary Academy to ensure broader cooperation between their scientific collectives and other ministries and agencies which constitute the agro-industrial complex and to direct the efforts of scientists and specialists toward the solution of tasks related to the realization of the Food Program. Toward this end it is essential for every scientific research and planning and design organization to work out plans for appropriate measures aimed at accelerating the application of achievements in biological sciences, at developing biotechnological processes which will provide savings of all types of resources and at improving the skills of research staff members and specialists in this area.

Ministries and agencies, planning-design and technological organizations, production associations and enterprises must be more energetic in putting before their scientific collectives timely scientific and technical tasks, as well as in taking effective measures to achieve the most rapid possible production application of the results from completed scientific work. It is necessary to require of scientific research organizations and VUZ's a higher level of results in the projects which are fulfilled on the basis of economic agreements, as well as to provide for their most rapid possible utilization in production.

It is essential to make wider use of business meetings between VUZ scientists and officials or specialists from production enterprises to discuss the most urgent scientific-technical problems and the issues related to the integration of science and production.

Gosplan, Gosstroy, the Academy of Sciences, the ministries and agencies must take measures to further improve planning for the development and utilization of our scientific-technical potential; this can be done mainly through active participation in the fulfilment of national programs, as well as in the development and realization of comprehensive republic program to solve the most important scientific, scientific-technical economic and social problems.

It is recommended that the ministries, agencies, the Academy of Sciences, scientific-technical institutions and production associations and enterprises work with Gosplan to consider the advisability of establishing new inter-sector production complexes and associations, which would base their activities on the comprehensive scientific and technical programs which have been approved.

Along with the Ministry of Construction, the Ministry of Agriculture, the Ministry of the Building Materials Industry, and the republic's Litmezhkolkhozstroy Association, Gosstroy has been assigned to develop and implement--in the 11th Five-Year Plan--additional measures to accelerate the production application of the achievements of science and technology.

The Academy of Science, the Ministry of Higher and Specialized Secondary Education, other ministries and agencies and scientific research institutions must work with planning-design and production organizations to ensure a fundamental improvement in invention and patent work.

Scientific research institutes and Lithuanian branches of union (i.e., national) institutes have been instructed to present every year before 1 March to interested ministries, agencies, associations and enterprises of the republic, as well as to Gosplan (and on issues of construction to Gosstroy also), suggestions on how to utilize the results of completed scientific and technical development projects, which can be applied in the economy of the Lithuanian SSR.

It is recommended that these scientific research institutions expand their work of helping ministries, agencies, associations and enterprises which come under republic or union-republic jurisdiction with the development of new products, with the establishment of up-to-date mechanization and automation equipment, and with improvements in technology and the organization of production.

It has been suggested that the republic's committee on scientific and technical progress should improve its leadership of the republic's organs for the coordination of scientific research and development, paying particular attention to the resolution of the most important inter-sector scientific-technical and social-economic problems. In the same way the committee should take a larger role in the work of increasing the integration of science and production and in making more effective use of the republic's scientific and technical potential.

It is recommended that Gosplan, the Academy of Sciences, the Ministry of Higher and Specialized Secondary Education, as well as other ministries and agencies, take measures to improve planning for the training of scientific and scientific-pedagogical personnel, especially in the most critical specialities of the biological, technical, physico-mathematical and economic sciences.

The Republic Committee on Scientific Personnel is being established under the CPL Central Committee to improve the planning, training and distribution of highly qualified scientific and scientific-pedagogical personnel.

It is essential that by 1990 the officials of scientific-research institutes and the main scientific subdivisions of these institutes and of VUZ departments, be people who, as a rule, have the doctor of science degree.

The decree approves the experience accumulated by the societies of mathematicians, physicists, and biochemists in discovering the most talented and scientifically able young specialists; it is recommended that the Ministry of Education, the Ministry of Higher and Secondary Specialized Education and the Academy of Sciences apply this experience on a broad basis to develop the creative abilities of students, as well as to improve the selection and training of scientific personnel.

It is suggested that beginning in 1983 the Academy of Science work with the Ministry of Higher and Specialized Secondary Education, the Central Committee of the Lithuanian Komsomol, and with other ministries and agencies which have scientific research institutions, to organize continuously running seminars or workshops for young scientists to discuss the most urgent questions of scientific and technical development.

The Ministry of Higher and Specialized Secondary Education, the Ministry of Health, the Ministry of Agriculture, the Academy of Sciences and other ministries and agencies which have scientific research institutions and planning-desig organizations, are directed to complete in 1983 the bulk of the work on improving the network and structure of the scientific and scientific service organizations under their jurisdiction. Toward this end it is proposed to change in a timely manner the direction of research and development work, to ensure that scientific forces are concentrated on the most important directions to eliminate subdivisions which are operating ineffectively, to improve the qualitative composition of research personnel on the basis of strict certification procedures, to raise the effectiveness of certification procedures in the struggle against unfruitful activities by the scientific and scientific service organizations which come under various jurisdictions and to supervise in systematic fashion the effectiveness of the work performed by the subordinate organizations of science and scientific services.

The Academy of Sciences, the Ministry of Higher and Specialized Secondary Education must work with Gosplan and Gossnab, as well as with other concerned ministries, agencies and scientific research organizations which come under union jurisdiction, to develop in 1983 measures for the establishment of specialized centers for the collective use of equipment and instruments for scientific research; the centers are to be located in the cities of Vilnius and Kaunas.

In addition, they must implement in the years 1983-1985 measures to improve substantially the quantity and quality of the equipment, instruments and materials available for scientific research.

Beginning in 1983 the Exhibition of the Economic Achievements of the Lithuanian SSR, along with the Academy of Sciences, the Ministry of Higher and Specialized Secondary Education, and other ministries and agencies, must hold on a systematic basis public exhibits of the latest scientific achievements, and once or twice during the five-year plan period they must organize republic-wide exhibits on the introduction of scientific and technical achievements into production.

The Lithuanian Scientific Research Institute of Scientific-Technical Information and Technical-Economic Research must improve significantly its work in providing scientific research institutions, planning-design and technological organizations, production associations and enterprises with information about the most important achievements of science and the best experience accumulated in the effort to improve the effectiveness of scientific research and development, and on the information servicing of union and republic comprehensive scientific-technical programs and the monitoring of their fulfilment.

The State Committee on Television and Radio, the State Committee on Cinematography, as well as the editorial boards of newspapers, journals and publishing houses must set out and implement measures aimed at turning the mass information media into organizers of the working people for the purpose of accelerating scientific and technical progress in all branches of the economy; they must ensure that all the material published on this subject is frank. They must provide for widespread discussion and publication of polemical materials on subjects related to trends in the development and improved effectiveness of scientific research, as well as to the utilization of scientific achievements and to improvements in the technical level and general standard of production.

It is recommended that the Znaniye (Knowledge) Society increase its propaganda among workers and specialists on the subject of the newest scientific and scientific-technical achievements, with reference to their use at work sites.

It is recommended that the CPL Central Committee, as well as the CPL gorkoms and raykoms improve their leadership of the party organizations at scientific research institutions, planning-design, technological organizations and VUZ's in the light of the 26th CPSU Congress and the 18th CPL Congress; they should devote more attention to the acceleration of scientific-technical progress, to the strengthening of ties between science and production and to increasing the effectiveness of scientific research.

It is suggested that the CPL gorkoms and raykoms, as well as the primary party organizations work to constantly improve the ideological-political and moral indoctrination of the scientific-technical intelligentsia, to increase in every way possible the responsibility felt by communists, officials, scientists and specialists for the broad and timely applications of scientific and technical achievements. They must also hold more frequent joint party meetings and sessions of party committees (buro's) at scientific institutions and production collectives.

8543
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TURKMEN FOREIGN AFFAIRS COMMITTEE DISCUSSES INTERNATIONAL SCIENTIFIC RELATIONS

Ashkhabad TURKMENSKAYA PRAVDA in Russian 24 Aug 82 p 2

[Article: "In the Permanent Committees of the Turkmen SSR Supreme Soviet"]

[Text] The standing committee on foreign affairs of the Turkmen SSR Supreme Soviet met 23 August in Ashkhabad under the chairmanship of G. Myalikgulyyev. It discussed the question of the effectiveness of the links between the Turkmen SSR Academy of Sciences and scientific organizations in foreign countries.

The rapporteur, Academician F. F. Stepanov, scientific secretary of the TSSR Academy of Sciences, and the deputies who spoke pointed out that the republic Academy of Sciences is putting forth considerable effort to develop these links and increase collaboration with scientific organizations in foreign countries. The period since the beginning of the Tenth Five-Year Plan has seen substantial increases in the amount of scientific research Turkmen scientists have conducted within the framework of an international program. There are extensive links between the TSSR Academy of Sciences and national academies of sciences and scientific organizations in Cuba, Algeria, Mongolia, Poland and other countries. These links involve a variety of types of scientific collaboration.

The committee approved what the Turkmen SSR Academy of Sciences has done to improve collaboration and strengthen ties with scientific organizations in foreign countries and recommended fuller exploitation of existing possibilities of increasing the effectiveness of foreign travel by Soviet scientists and specialists and an expansion of joint research involving the study and development of deserts, the use of solar energy and problems in physics and chemistry.

An appropriate resolution was then adopted concerning the question under discussion.

8963
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TURKMEN SCIENTIFIC-TECHNICAL SOCIETY CONGRESS HELD

Ashkhabad TURKMENSKAYA ISKRA in Russian 23 Sep 82 p 2

[Article by Academician of the TuSSR Academy of Sciences O. Ovezgeldyyev, chairman of the Turkmen Republic Scientific and Technical Society: "Bearers of Technical Progress"]

> [Text] The 6th Congress of Turkmenistan Scientific and Technical Societies will convene today in Ashkhabad. This article discusses the activities of NTO [Scientific and Technical Society] activists and their contributions to scientific and technological advance.

Technical innovation by working people has taken on a vast scale in this country, including our republic. At every plant, design office, institute, or laboratory one can find people of inquiring mind, for whom innovation is a need, a calling, a source of happiness. The following facts indicate the mass nature of this movement: today the republic's NTO Council unites 16 branch boards, which represent 72,000 members of NTO. In the last five years there has been a substantial increase in the number of primary organizations, especially in rural localities.

The work of the scientific and technical societies is directed primarily toward fulfilling and overfulfilling production plans, adopting scientific organization of labor, improving product quality and reliability, and toward total mechanization and automation of production. NTO activists have come together for their 6th Congress enriched with knowledge and experience. The campaign for scientific and technological advance is a decisive condition for increasing the effectiveness of societal production and improving product quality.

This congress will be taking place in an atmosphere of vigorous political and labor activity evoked by preparations for the 65th anniversary of the Great October Revolution and the 60th anniversary of establishment of the USSR.

Science is the foundation of scientific and technological advance. Today Soviet Turkmenistan possesses considerable scientific and technological potential. Dozens of scientific establishments are presently operating in this republic, employing more than 5000 scientific workers, including 1000 candidates of sciences and approximately 100 doctors of sciences. Achievements by the republic's scientists in such fields of modern science as solar and earth physics, seismology, breeding of fine-staple cotton, utilization of solar energy, exploitation of deserts, plus others have gained wide recognition both in this country and abroad.

Important results have also been obtained in incorporating scientific and technological advances in the nation's economy. Just during the 10th Five-Year Plan this republic's enterprises installed more than 1340 units of automatic and semiautomatic equipment, 35 automatic and 160 mechanized production lines with the active participation of members of scientific and technical societies. Savings from the adoption of new equipment totaled more than 70 million rubles.

The republic boards and local NTO organization councils have exercised public oversight over fulfillment of new equipment adoption plans. Annual reviews and competitions for the best suggestion are held. At motor transport enterprises, for example, the initiative of the worforce of the Moscow ZIL Plant pertaining to organization of socialist competition for accelerated adoption of scientific and technological advances into production was widely publicized. A total of 1155 units of new equipment, with savings of 860,000 rubles, were adopted in this branch with the active participation of NTO members. At the Turkmendorproyekt Design Institute, a third-generation YeS-1020 computer was installed according to the new equipment plan; this computer helps perform all types of calculations, produce cost estimates, and verifies execution.

Much has been accomplished to solve such an important problem as total mechanization of production. Documentation of manual and heavy physical labor has been performed for this purpose. Execution of measures in this area has made it possible in just two years to mechanize the labor and ease the jobs of 13,000 workers. More than 600 innovator teams are working on development and adoption of means of mechanization of labor-intensive processes. Considerable work in this area has been performed by the NTO councils of the Karakumorgtekhstroy Trust, the Chardzhou Building Construction Combine, the Ashkhabad Motor Transport Production Association, and the Shatlykgazdobycha Production Association.

Primary organization councils became actively involved in the nationwide review of efficiency of utilization of raw materials, supplies, and fuel-energy resources. More than 2000 suggestions received from NTO members and adopted into production helped save approximately 9000 tons of metal, 7.6 million kilowatt hours of electric power, and 1600 tons of standard fuel.

A big job is being done by NTO activists to improve product quality. Working together with ministries and agencies, they carried out a number of measures to expand the product list and increased manufacture of products bearing the state Seal of Quality, and to retire from production or to modernize obsolete models. Here is the result: while at the beginning of the 10th Five-Year Plan 78 different product items in this republic were being marked with the pentagonal emblem, by the beginning of the 11th Five-Year Plan the figure was 361 product items.

Important measures have been carried out to ensure safety on the job, to improve production procedures, and to eliminate factors deleterious to people's health. Many ministries and agencies, with the active participation of NTO members, have formulated plans for branch standardization and metrological support of production, utilizing industrial safety standards.

In the last five years 4500 NTO members have traveled on scientific business outside the republic for the purpose of adoption of advanced know-how into production. Approximately 400 suggestions generating savings of three and a half million rubles have been adopted based on the results of such official travel. An initiative on the part of a number of enterprises in the Georgian SSR, which held competition under the slogan: "Every NTO council a headquarters for seeking production reserve potential," was extensively publicized and popularized. This initiative produced considerable success for NTO activists at the Ashkhabad Stocking and Knitwear Factory, Glavkarakumstroy's Chardzhou Machinery Repair Plant, and the Turkmenremvodstroy Trust.

The are many examples of vigorous activity by NTO members. Thanks to the support and assistance of the All-Union Council of Scientific and Technical Societies, productive contacts have been established with scientific and technical societies in foreign countries. In October 1980 Hungarian Economy and Technology Days were held in Ashkhabad for the first time. Scientists and specialists from the brother country presented reports on development of the chemical industry, urban transit, the gas, oil and food processing industries, machine building, and agriculture. This get-together unquestionably enriched the knowledge and experience both of our specialists and the Hungarian specialists.

However, while giving due credit for the considerable work accomplished by the scientific and technical community, we must note that their activities could have produced greater results. At a number of enterprises little attention is devoted to product quality, technical improvement of the machine tool inventory, and adoption of new innovations. Many NTO boards and councils do not fully utilize opportunities to involve scientific and engineering-technical societies in implementing plans pertaining to adoption of new equipment and mechanization of labor-intensive processes. But there is a large area of activity here for NTO activists. It is their duty to concentrate maximum efforts on acceleration of scientific and technological advance in all branches and sectors of the economy.

Scientific and technical societies should be performing important tasks in the area of implementing the USSR Food Program, ratified at the May (1982) CPSU Central Committee Plenum. Each and every NTO member, both in urban and rural localities, should clearly define his place in accomplishing this task and make a substantial contribution toward increasing farm crop yields, livestock unit productivity, and toward reducing production losses along the entire chain of production. NTO activists can accomplish a great deal toward increasing the labor productivity of kolkhoz farmers and workers employed at processing enterprises.

There is no doubt that NTO members will carry out their assigned tasks with honor, greet the glorious jubilee of the USSR with worthy deeds, and make a worthy contribution toward implementing the plans of the 11th Five-Year Plan and the nation's Food Program.

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CALL FOR MORE EFFICIENT UZBEK SCIENTIFIC EFFORT

Tashkent PRAVDA VOSTOKA in Russian 29 Aug 82 p 2

[Article by Academician A. Sadykov, Hero of Socialist Labor, president, Uzbek SSR Academy of Sciences: "The Demand of the Times, Toward the Plenum of the Central Committee of the Communist Party of Uzbekistan"]

[Text] September will see a meeting of a plenum of the Central Committee of the Communist Party of Uzbekistan with the following agenda: "Tasks of the republic party organization associated with implementation of decisions of the 26th CPSU Party Congress and the November (1981) and May (1982) plenums of the CPSU Central Committee and of directives from Comrade L. I. Brezhnev on increasing the effectiveness of scientific research and strengthening the ties between science and industry." This is yet another convincing illustration of the party's continuing steadfast concern for the advancement of science and for integrating it closely with the entire economic and cultural system of a mature socialist economy.

The 26th Congress of the CPSU and the 20th Congress of the Communist Party of Uzbekistan placed a high value on the role and importance of science in the solution of key economic problems. "The party of communists," Leonid Il'ich Brezhnev declared at the 26th CPSU Congress, "proceeds on the basis of the fact that the building of a new society without science is inconceivable." Drawing upon advanced scientific and technical thinking not only increases society's intellectual potential, it multiplies its wealth as well.

Continuing assistance on the part of the Central Committee of the Communist Party of Uzbekistan has made real advances possible in the realm of science and helped increase the effectiveness of basic and applied research. The Academy of Sciences introduced 675 proposals into national economic practice over the course of the Tenth Five-Year Plan period for a overall economic gain of more than 1.6 billion rubles. The year 1981 saw a return of 5 rubles 80 kopeks on each ruble invested in science.

Work on the production and use of radioactive isotopes and the application of radiation technology, methods of activation analysis, cybernetics research and the introduction of automatic control systems and theoretical and applied research in seismology and the development of earthquakeproof structures have all received wide publicity far beyond the borders of the republic. Many predictions by geologists, which have made it possible to organize for the industrial exploitation of a variety of mineral resources, have been borne out in practice. Major research has been undertaken on

the chemistry of natural compounds, which has made possible the development of effective domestic medicines.

A substantial contribution has been made to the development of our cotton economy and to the effort to increase agriculturla production as a whole. The new "Tashkent-6," "AN-Uzbekistan-3," "AN-Samarkand-2.3," "ok-oltyn-3," "Oktyabr'-60," "AN-Bayaut-2" and "korotkostebel'nyi [short-stem]-1" cotton plant strains have been developed, which will be used over the course of the Eleventh Five-Year-Plan period for the sixth strain changeover. New low-toxicity defoliants and the A-1 cotton plant growth stimulant proposed by institutes of the Uzbek SSR Academy of Sciences and TIIIMSKh [Order of the Red Banner of Labor Tashkent Engineering Institute of Irrigation and Agricultural Mechanization] are already being used in cotton plant defoliation.

The scientific bases and the implementing technology for enriching semiarid and arid pasturelands, which are making possible a great increase in feed crop yields, have been developed and now introduced into production operations. Recommendations concerning the use of chlorella and cotton plant stalks in livestock fattening programs have achieved recognition.

Economists from academy and branch institutes and departments have developed an integrated program for scientific and technical advancement and a plan for developing and allocating the productive forces of Uzbekistan until the year 2000. Long-term planning has been completed for the social and economic development of the cities of Tashkent and Dzhizak and for the efficient utilization of labor resources.

An important event in the spiritual life of the peoples of our country was the publication in the Uzbek and Russian languages of the works of Biruni, Ibn Sina and others. Archeologists have achieved concrete success in the field of the study of the ancient and early medieval history of Uzbekistan. They have accomplished a great deal in the effort to determine the age of Tashkent, Dzhizak and Khiva.

This does not mean, however, that what our scientific institutions have been doing has been entirely in line with the requirements of the times. We have accumulated a backlog of no small number of unsolved problems associated with the planning and administration of scientific research, with organizational structure and with the training of personnel. Science can and must give society a lot more if the republic's scientific potential, which has grown in recent years, is to be exploited more effectively. For the fact is that within the Academy of Sciences system alone function 35 scientific research institutes, 7 design bureaus and 2 pilot plants employing more than 15,000 people. The Academy comprises 42 academicians and 58 corresponding members as well as 2000 doctors and candidates of sciences. The republic has more than 200 scientific research institutes, VUZ's and planning and design offices, fuller exploitation of the potential of which will make possible the successful solution of many problems stemming from Uzbekistan's place in the national division of labor and its particular regional characteristics. "Life demands," comrade Sh. R. Rashidov emphasized at the 20th Congress of the Communist Party of Uzbekistan, "that scientific research be more closely related to the basic directions and concrete requirements of social-economic development."

Also of vital national economic importance are such problems as development of the various branches of our cotton industry, implementation of the Food Program, further research on and efficient utilization of mineral-raw material and fuel and energy

resources, the R&D required and then implementation of our water, powder metallurgy and composite materials programs and so on.

Further intensification of our cotton program will require research undertaken with the objective of improving cotton quality and of establishing cotton as a general-purpose crop, a thoroughgoing transformation of our agricultural technology, the application of mathematical crop-forecasting methods and the mechanization and automation of production operations on the basis of improved machinery. In this connection we also need to the greatest possible extent to accelerate the research and planning involved and then the implementation of an integrated program of balanced development of all branches of our cotton industry.

Implementation of the Food Program will require first of all the introduction on a larger scale of the results of completed research and recommendations aimed at increasing the productivity of arid croplands, the remedying of the protein deficit by producing protein, the production of nutrient yeasts from fermented guza-paya [cotton stems and bolls], the use of chlorella and blue-green algae in rice growing and animal husbandry and the extensive utilization of the republic's plant resources (soy beans, licorice, hollyhocks etc.). Given the strained state of the balance and our growing shortage of water resources, a necessary prerequisite for further development of our cotton and food industries will be seen to lie in study of the problems involved in insuring more efficient exploitation of these resources and in diverting part of the flow of Siberian rivers to Central Asia and Kazakhstan.

The development of our power engineering, machine building, ferrous and nonferrous metallurgy and chemical industries is assuming increasing importance for advances in sciences and technology. The problem of increasing our power resources remains an urgent one. In addition to discovering new deposits and increasing our extraction of petroleum, gas and coal, republic scientists must continue their work on the exploitation of solar and atomic energy.

The chemists have important tasks to accomplish as well. Most important remains the problem of developing new polymer and composite materials and physiologically active compounds and material- and money-saving production processes which will make it possible to make full use of raw material resources and to eliminate environmental pollution.

The Academy of Sciences has begun work on such important problems as powder metallurgy, anticorrosion measures and the mechanization and automation of the most labor-intensive processes. A laboratory has been set up whose task includes study of processes involved in the formation of powder coatings and alloys and the fabrication of components of greater wear-resistance and durability.

Advances in basic and applied research oriented toward the accomplishment of national economic tasks will require the exploitation of our entire scientific potential. At the same time, however, analysis of the work of our institutes, laboratories and sections points to dificiencies in the planning and organization of their scientific research efforts. In a number of institutes there will still be found many small subdivisions without highly qualified personnel to direct their work, and the number of research projects will occasionally exceed the number of scientists. This results in dispersion of resources and manpower, to duplication of effort and to the absence of

any organic links between projects under way in laboratories within a group of institutes and between them. The return on each ruble spent in Academy of Sciences institutions consequently varies between 0.10 and 100 rubles.

The Academy of Sciences is now undertaking a major effort to review the subject matter of research under way, to eliminate cases presenting with a multiplicity of topics and duplication of effort, to consolidate scientific subdivisions and to improve coordination beteen Academy branch institutes and VUZ's. We have undertaken a reorganization of the structure of the scientific institutions of the Uzbek SSR Academy of Sciences; 59 laboratories have been combined into 29, while 9 laboratories have been eliminated as showing little promise. To the end of consolidating manpower and generally improving the system of scientific institutions, we are looking at the possibility of integrating institutes with economic specializations.

We have strengthened ties between the Academy and VUZ's and institutes of the USSR Academy of Sciences as well as the academies of sciences of the other union republics. Exchanges of experience in studying nationally important problems in physics, chemistry, biology, economics and other fields have now become traditional. While scientific institutions of the Uzbek SSR Academy of Sciences participated in work on 23 all-Union programs directed toward solution of basic scientific-technical problems in the course of the Tenth Five-Year-Plan period, the number of these programs will rise to 30 during the Eleventh Five-Year Plan.

Joint efforts are now under way to draw up an integrated program of scientific and technical problems along with work on plans for the development and distribution of productive forces, on the use of solar energy and computer technology, protecting the environment, problems in the history of Uzbekistan and on the demograohy and utiliza- of labor resources.

By decision of the Tashkent party obkom and the presidium of the Uzbek SSR Academy of Sciences, the Tashkent Scientific Center has been created with the objective of improving creative links between the republic's scientific institutions. Plans call for the establishment of a scientific center in Samarkand as well.

Progress in science and technology does not consist solely, we could even say does not consist so much, in individual record-setting scientific advances. It consists above all in the extensive exploitation of these advances within all branches of the national economy without exception. "Industry and true science," D. I. Mendeleyev wrote, "do not live one without the other; they derive strength from one another, and it is this relationship which yields the benefit." And the most urgent question on the agenda today is the practical introduction of scientific discoveries and inventions, a strengthening of the ties between science and industry and increasing the effectiveness of our scientific research.

Increases in the return from our scientific research is evidence of the progress we have made toward solving these problems. We have found effective ways to integrate science and industrial production operations and are changing over to a system of through project planning for applied research and then for the practical introduction of the results of this research.

Scientific institutions of the Uzbek SSR Academy of Sciences are doing a lot of research for enterprises on the basis of economic contracts, agreements on creative

collaboration and economic contract work. Agreements like this have been concluded with the Sredazkabel', Zagotkhlopkoprom, Uzbeksel'mash, Elektrokhimprom, Krasnaya zarya, Navoiazot and V. P. Chkalov production associations; the Tashkent textile combine, the Tashkent tractor plant; the ministries of agriculture, the fruit and vegetable industry and light industry; the Almalynskiy and Navoiyskiy mining and metallurgy combines etc.

This research is oriented toward the development of new technologies and the preparation of recommendations for raising the technical level of production processes, increasing labor productivity and improving working conditions. This effective relationship with out enterprises should now be developed even further.

The past three years, however, have seen the proportion of research conducted on the basis of economic contract stand at the 20 per cent level. We must therefore expand and improve the relations between scientific and production organizations based upon economic contracts and increase the volume of recommendations science makes to industry and, on the other hand, intensify the demands our ministries, departments and industrial enterprises place upon science. Economic contracts should lead to the solution of major problems and yield important economic benefits.

Evidence of the complexity, and occasionally the painfulness, of dealing with problems involved in the process of introducing the practical results of scientific reasearch into industrial production operations is to be found in the fact that real opportunities for basic research to exercise any influence on industrial development or upon the formulation of technical policy in one branch or another of the national economy remain in practice far from adequate. Our economy is currently utilizing less than 60 per cent of the product of scientific-technical R&D efforts. Of 137 of the most important projects completed in the course of the Tenth Five-Year-Plan period, 75 have been introduced into practical operation. This is partly the responsibility of scientific organizations themselves. The submission to industry of incomplete proposals, the absence of conditions necessary to realize these proposals and of calculations of anticipated effectiveness and economic demand, scientific recommendations of inadequate specificity and inadequate participation by our scholars and scientists in the practical introduction of the product of their research and in developer supervision delay this process. Scientific proposals will not infrequently meet with indifference on the part of individual ministerial, departmental, association and enterprise officials.

It is the ministries which are responsible for the slow introduction of important research products such as a method of obtaining food protein and phytin from cotton seed meal, recommendations for increasing the productivity of pasturelands, methods of fermenting guza-paya for silage and of producing high-quality, high-strength cements and the production of chlorella paste.

Intensification of our scientific efforts presumes a strengthening of their material-technical base. The construction, assembly and installation operations for the Academy called for in the economic plan, however, are not being performed on any systematic basis. The past six years have seen 8.7 million rubles of capital investment money allocated for the Uzbek SSR Academy of Sciences go unused.

More effective utilization of scientific facilities and equipment constitutes an important way to improve the quality of our scientific research. It will accordingly

be necessary to enlarge our system of central facilities making possible joint utilization of unique and very costly instruments and equipment.

A joint-use computer center attached to the Kibernetika scientific production association is now in successful operation within the Academy of Sciences, and a center from which measuring instruments can be rented has been set up. The activation analysis center, which is organizationally linked to the Uzbek SSR Academy of Sciences' Institute of Nuclear Physics, has been created as an inter-republic facility, while within the near future it is proposed to set up joint instrument-use centers at the Institute of Plant Chemistry for NMR spectroscopy, spectropolarimetry and mass spectrometry, at the Institute of Bioorganic Chemistry for X-ray diffraction analysis, NMR spectroscopy and mass spectrometry, the Institute of Electronics for accelerated electron beam irradiation, the Institute of Geology and Geophysics for X-ray spectral analysis and at the Institute of Biochemistry for electron microscopy.

We must give our most concentrated attention to the task of training of highly qualified scientific personnel—our doctors and candidates of sciences. Recent years have in the meantime seen us fail to fulfill our plan for graduate school admissions in a number of the most important specialties—machine building, the mathematical disciplines, geology and others. Academy scientific personnel include only 5.7 per cent with the doctor of sciences degree, 2.9 per cent in the case of the technical sciences.

One of the most important tasks today is to fulfill the graduate school admissions plan, which takes into account the needs of specialties suffering personnel shortages, and improve our entire system of graduate training. This would include, of course, fulfillment of existing plans for the defense of doctoral and candidate dissertations. We must also devote efforts to attracting more talented young people into scientific research and to strengthening the ties between the Academy and the schools and VUZ's, for it is in this that will be seen to lie a guarantee of success in the training and preparation of our next generation of scientists.

Uzbekistan's scientists have accomplished no small number of tasks which have contributed to the growth of the republic's many-branched economy and to the development of advanced technologies for industry and agriculture. Times change, however, and progress in science and technology will require repeated new efforts on the part of both science and industry to achieve new advances.

The discussion by the plenum of the Central Committee of the Communist Party of Uzbekistan of questions concerning the effectiveness of our scientific effort and the strengthening of its ties with industry will be a powerful new impetus to fundamental improvement throughout the entire system of this most important national effort.

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UKRAINIAN SCIENTIFIC CENTER ACTIVITIES REPORTED

Moscow PRAVDA in Russian 5 Dec 82 p 5

/Conversation between K.M. Sytnik, vice president of the Ukrainian SSR Academy of Sciences, and the PRAVDA UKRAINY editorial board: "Report on a Scientific Center"/

/Text/ Six oblasts of the republic (the Kiev, Vinnitsa, Zhitomir, Khmelnitskiy, Cherkassy and Chernigov Oblasts) are within the sphere of activities of the Northwestern Scientific Center of the UkrSSR Academy of Sciences. The center's work was examined comprehensively at an expanded session of the UkrSSR Academy of Sciences Presidium; officials of party and soviet organs, and high-level personnel from a number of the republic's agencies, as well as prominent scientists, participated in the session.

An analysis of the state of affairs was contained in the report of G.S. Pisarenko, an academician of the UkrSSR Academy of Sciences and chairman of the North-Western Scientific Center, and in a presentation by K.M. Sytnik, academician and vice president of the UkrSSR Academy of Sciences, who headed a committee to check on the center's activities. Important issues were raised in presentations by the following: S.I. Gurenko, deputy chairman of the UkrSSR Council of Ministers, B.Ye. Paton, academician and president of the UkrSSR Academy of Sciences, G.I. Revenko, second secretary of the party's Kiev Obkom, L.I. Krivoruchko, second secretary of the party's Vinnitsa Obkom, V.A. Kharchenko, secretary of the Party's Chernigov Obkom, Yu.A. Vetrov, rector of the Kiev Construction Engineering Institute, R.I. Silin, rector of the Khmelnitskiy Technological Institute of Consumer Services, V.P. Shevchenko, head of the Combined Department of Science and New Technology of UkrSSR Gosplan.

The editorial board of PRAVDA UKRAINY asked K.M. Sytnik, vice president of the UkrSSR Academy of Sciences, to tell us in more detail about the problems considered at the session and about the tasks which face the region's scientists.

"The Northwestern Scientific Center is the youngest: it was established less than two years ago in January of 1981," said Konstantin Merkur'yevich. "During this time the center's organizational structure has been developed and much has been done to discover the problems and scientific-technical tasks which are important for the economic and social development of this groups of oblasts. The efforts of 37 institutions of the UkrSSR Academy of Sciences, 15 VUZ's and 58 sector scientific-research organizations in the republic have been concentrated on the resolution of urgent problems. Agreements on scientific-technical cooperation with the UkrSSR Academy of Sciences have been signed with enterprises and organizations in each of the oblasts. Institutes of the Southern Division of the All Union Agricultural Academy imeni Lenin are also participating in coordinated work."

The Northwestern Center has worked with the oblast party committees to develop a complex plan for the development of science and the acceleration of scientific and technical progress in this region in the 11th Five-Year Plan. The plan is based on four regional scientific-technical programs: "Fertility," "The Use of Natural Resources," "Automation" and "Quality." The last of these is oriented toward improvements in the quality of machines and building parts based on the use of new materials and progressive technologies. A science coordination council has been established in each of the region's oblasts. It includes scientists, as well as party and soviet officials, farm and enterprise managers, leading specialists in the various sectors of the national economy.

The republic's Northwest is a relatively extensive region, which is agriculturally and industrially specialized. There is much scope for the efforts of scientists and producers.

Recently I returned from Cherkassy Oblast with many impressions. Along with the Vinnitsa and Khmelnitskiy Oblasts, it provides a significant portion of the republic's harvest of the "sweet root."

The situation in sugar beet farming today cannot fail to concern scientists. The most important reserve for increasing sugar production, as was noted in the November (1982) plenum of the Ukrainian Communist Party Central Committee, lies in the reduction of losses during harvesting, shipping, storage and processing. An analysis has shown that in the last five-year plan the biological harvest of sugar in Khmelnitskiy Oblast amounted to 48.3 quintals per hectare of sown sugar beets, while the actual amount obtained was less than half that figure. Nor is the situation any better in a number of other oblasts.

This was discussed with concern by the secretaries of the party obkoms and by scientists at today's session of the Presidium. The losses result from an inadequate amount of machinery used in sugar beet production, by the defects in the harvesting and other equipment, as well as by the excessively long storage periods during which the beets lose their sugar content. And how much land, fertile Ukrainian black earth goes to the sugar plants with the sugar beets! Soil is lost, the processing of the sugar beets is frequently interfered with, transport facilities are used needlessly, excess fuel is consumed and the environment is polluted.

Of course, there is a whole series of problems which arises here. They can be solved only if there is widespread practical utilization of scientific development work, aimed at increasing the yield of sugar beets and their sugar content, at creating and introducing progressive new technologies for growing, harvesting, storing and processing them. There is much to be done not only by the Northwestern Scientific Center, in cooperation with employees of the agro-industrial complex, but also by scientists--biologists, chemists soil experts, materials experts, physicists, plant breeding specialists from the most diverse institutes of the UkrSSR Academy of Sciences, from VUZ's, from the Southern Department of the All-Union Agricultural Academy imeni Lenin and from other sector scientific research organizations.

Meetings and conversations, as well as trips thoughout the region's oblasts, confirm once again the correctness of the chosen path, which is an orientation toward the resolution of the major comprehensive scientific-technical and socio-economic problems which are of fundamental significance for the economy of the region and the republic as a whole.

Let us take, for example, the ecological-economic reasons for the large-scale drainage work in Poles'ye. The consequences are seen not only in this zone, but also at times quite far from it, including the water reservoirs of the Dnepr. For example, the hydrochemical composition of the water and the hydrobiology of the Kremenchug water reservoirs in Cherkassy Oblast changed recently: more shallow waters areas have been formed. All this proves once again that the solution of major economic problems must be based first of all on careful study of the processes occurring in nature and on a determination of the patterns which they follow.One cannot know them poorly or, even worse, ignore them: not only can irreversible harm be done to nature, but the effectiveness of the economic measures undertaken can also be reduced.

Better forecasting of the socio-economic and other consequences of economic decisions which have been made is required in order to make scientifically grounded recommendations on how to prevent or eliminate undesirable consequences of this kind. Without the combined efforts of a number of scientific centers it is difficult to predict success. For example, the research on the problems of the Poles'ye required close interaction between the Northwestern and Western Scientific Centers, and for the analysis of the reasons why the land was being submerged the Southern and Dnepr Scientific Centers of the UkrSSR Academy of Sciences were also called in.

At present fodder production is being intensifed. However, frequently there are not enough highly effective preservatives and stabilizers for keeping the green fodder and moist grain. On-site workers do not have available yet any express methods or instruments for analyzing the soil to determine whether any given nutrients are present. And, after all, without this, it is difficult to put land cultivation on any real scientific basis.

At the session many examples of the practical realization of scientific research results were cited. For example, the Brovary Powder Metallurgy Plant has implemented many highly effective ideas resulting from the work of the UkrSSR Academy of Sciences Institute of Materials Technology. Progressive

technology, developed by Kiev thermal physicists, for obtaining edible fruit powders is finding its way into use more and more frequently. The achievements of chemists are being introduced at the Chernigov Khimvolokno Plant and at a number of other enterprises in the region. The UkrSSR Academy of Sciences Institute of Arc Welding imeni Ye.O. Paton has introduced at its bearing plant in Vinnitsa a progressive technology for hardening parts by means of plasma spraying. And a technology for producing casting dies from high-strength cast iron, which was developed by the UkrSSR Academy of Sciences Institute of Casting Problems has found application at the Krasnyy Oktyabr' Plant in Fastov.

Much useful work has been done for the enterprises of this region by the Institute of Automation of the USSR Ministry of Instrument Making, Automation Equipment and Control Systems, Kiev University, the Vinnitsa Polytechnical Institute, the Institute of Electrodynamics of the UkrSSR Academy of Sciences and by other scientific collectives.

But at present no everyone is energetically introducing the innovations proposed by science. And even the scientists themselves are not always sufficiently persistent, energetic and enterprising in moving the results of their studies into practice. And the November (1982) plenum of the CPSU Central Committee, Comrade Y.V. Andropov, general secretary of the CPSU Central Committee, noted that if we want to move forward in earnest with the introduction of new equipment and new labor methods, then everyone must not just propagandize them, but discover and eliminate specific difficulties which are hindering scientific and technical progress.

If a technology, which has been proposed by scientists has received recognition and has been introduced at one industrial enterprise, or at one kolkhoz or sovkhoz, then it is the duty of all scientific centers where there is a need to apply this technology to ensure its "circulation" at all enterprises or farms of this type.

In its organizational work the Northwestern Center still at times proceeds along the path of mechanically including in the regional plan for the acceleration of scientific-technical progress assignments which have little connection with each other, and which are aimed at the resolution of insufficiently important scientific-production tasks, which are in the interests of individual enterprises and organizations. Of course, "gaps" of this kind can be explained to a certain degree by the fact that the center is in its formative period. However, in the future, when existing inadequacies have been eliminated, the work must be raised to a qualitatively higher level, and, I would say, it must "find itself," and concentrate its efforts on larger scale problems.

The forces and experience for this exist. The region's oblasts have been visited by 170 scholars from academic and sector scientific research institutes. Inter-agency laboratories, departments and experimental sectors focused on specific problems have been established. Specialists for the regions' economy are being trained in VUZ's and through advanced study.

The interaction between the Northwestern Scientific Center and the UkrSSR Academy of Sciences Institute of Economics must become closer. I remind you

that in accordance with the decree adopted in January 1981 by the Central Committee of the Ukrainian Communist Party and the UkrSSR Council of Ministers "Concerning Certain Measures to Increase the Effectiveness of the Work by Scientific Centers of the UkrSSR Academy of Sciences within the System of Management for Scientific And Technical Progress," the Institute of Economics of the UkrSSR Academy of Sciences was assigned to provide the scientific and methodological leadership of research on areas related to the management of scientific and technical progress in the oblasts of the Northwestern region of the republic. Unfortunately, the scientific center is not feeling the existence of any such leadership, especially in its work on the formulation of the "Comprehensive Program of Scientific and Technical Progress and its Socio-Economic Consequences for the years 1986-2005 in the UkrSSR." The economists should have started this work long ago.

"The discussion of the report concerning the activities of the Northwestern Scientific Center presented at the expanded session of the UkrSSR Academy of Sciences Presidium was very lively and extremely useful," said K.M. Sytnik at the conclusion of the conversation. "We hope that as a result, a clear realization of a set of measures will help to transform the tasks set out in the decisions of the November (1982) plenums of the CPSU Central Committee and the Ukrainian Communist Party Central Committee into concrete and practical matters."

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GEORGIA POLYTECHNIC PLANS MORE COMPUTERS, LINKS TO PRODUCTION

[Editorial Report] Tbilisi KOMUNISTI in Georgian on 15 November 1982 page 4 carries an 1800-word piece by Docent D. Dzhaparidze, secretary of the Polytechnic Institute's party committee, concerning the institute's efforts in light of the Sixth (Science) GCP Central Committee Plenum on ways to speed scientific-technical progress and put scientific advances into production faster. The author presents figures on the projects completed, number of practical applications adopted in industry, and types of links with industries and sectors (scientific-training production associations, institute department [kafedra] branches established in particular enterprises, and the like).

There is some focus on increased use of automation and computer technology in designing and producing machine parts and components. By year's end, graduate students and faculty will have completed a model [maket] of a numerically-program-controlled universal lathe, with series production to be started soon by Stankostroitel'. Laboratories producing software programs for the design of parts and components have already installed the equipment, and a 2-million-ruble computer and graphics terminals will soon go into operation. With this new thrust, coming generations of engineers and designers will be thoroughly skilled in this kind of technology.

The institute also needs its own testing and experimental production facilities. One is already at hand, in Digomi. A bigger on-campus base will be set up in 1983-1984, to serve as the nucleus of the institute's own scientific-production association.

One worry in all this has been the slow growth of cadres; the number of doctors has actually declined. To turn the situation around, promising candidates of science are to be kept on full pay while working on their doctorates. Student design bureaus are to be expanded, and students working in them are to receive pay.

ECONOMIC EFFORTS OF GEORGIAN ACADEMY'S TECHNICAL INSTITUTES DESCRIBED

[Editorial Report] Tbilisi KOMUNISTI in Georgian on 17 November 1982 page 2 carries a 1700-word article by V. Makhaldiani, academic secretary of the Georgian Academy of Sciences Department of Applied Mechanics and Control Processes, describing how that department's five institutes are conducting fundamental research of direct applicability to industry and the economy. He cites figures showing that each ruble invested in research yields several rubles in economic effect. Examples are drawn from the work of two or three institutes. The Machinery Mechanics Institute's work in the theory of noise and vibration resulted in findings which found direct application in the design and manufacturing work of the Tskhinvali Vibrator Plant, resulting not only in huge savings industry-wide but also in better working and environmental conditions for those using the machinery. The findings of the Construction Mechanics and Seismostability Institute found application in construction of underground pressure [napornyy] structures of the Inguri GES. The Mining Mechanics Institute came up with new blast drilling techniques. Overall, instrument making is a major focus in the department. Plans call for expanding the academy's design bureau and setting up another by 1985. More computer technology is being introduced. Finally, several paragraphs deal with work on the development of adiabatic internal combustion engines, with the joint participation of the Georgian Academy of Sciences, the Georgian Polytechnic Institute, and Moscow's Bauman Higher Technical School.

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